CSIRO PUBLISHING
www.publish.csiro.au/journals/is *Invertebrate Systematics*, 2006, **20**, 203–254

Systematics of the Australasian spider family Pararchaeidae (Arachnida : Araneae)

Michael G. Rix[A,B]

[A]Queensland Museum, PO Box 3300, South Brisbane, Queensland 4101, Australia.
[B]Present address: Western Australian Museum, Locked Bag 49, Welshpool DC, Perth, WA 6986, Australia.
Email: rixm01@student.uwa.edu.au

Abstract. The Pararchaeidae, a family of cryptic spiders known only from Australia and New Zealand, is revised. Six new genera: *Anarchaea*, gen. nov., *Flavarchaea*, gen. nov., *Forstrarchaea*, gen. nov., *Nanarchaea*, gen. nov., *Ozarchaea*, gen. nov., *Westrarchaea*, gen. nov., and 24 new species are described, 23 from mainland Australia and one from New Zealand. *Anarchaea*, gen. nov. from eastern Australia contains four species: *A. corticola* (Hickman, 1969), comb. nov. (type species), *A. falcata*, sp. nov., *A. raveni*, sp. nov. and *A. robusta* (Rix, 2005), comb. nov. *Flavarchaea* from eastern, southern and south-western Australia contains seven species: *F. anzac*, sp. nov., *F. badja*, sp. nov., *F. barmah*, sp. nov., *F. hickmani* (Rix, 2005), comb. nov., *F. lofty*, sp. nov., *F. lulu* (Rix, 2005), comb. nov. (type species) and *F. stirlingensis*, sp. nov. *Forstrarchaea* is represented only by the type species *F. rubra* (Forster, 1949), comb. nov. from New Zealand. *Nanarchaea* from eastern Australia contains two species: *N. bryophila* (Hickman, 1969), comb. nov. and *N. binnaburra* (Forster, 1955), comb. nov. (type species). *Ozarchaea* from Australia and New Zealand contains 16 species: *O. bodalla*, sp. nov., *O. bondi*, sp. nov., *O. daviesae*, sp. nov., *O. forsteri*, sp. nov., *O. harveyi*, sp. nov., *O. janineae*, sp. nov., *O. ornata* (Hickman, 1969), comb. nov. (type species), *O. platnicki*, sp. nov., *O. saxicola* (Hickman, 1969), comb. nov., *O. spurgeon*, sp. nov., *O. stradbroke*, sp. nov., *O. valida*, sp. nov., *O. waldockae*, sp. nov., *O. werrikimbe*, sp. nov., *O. westraliensis*, sp. nov. and *O. wiangarie*, sp. nov. *Pararchaea* Forster, 1955 is represented only by the type species *P. alba* Forster, 1955 from New Zealand. *Westrarchaea*, endemic to south-western Western Australia, contains three species: *W. pusilla*, sp. nov., *W. sinuosa*, sp. nov. (type species) and *W. spinosa*, sp. nov. A morphological cladistic analysis of the Pararchaeidae supported monophyly of the genera. Natural history information is summarised for each species where known, and the moulting behaviour, mating behaviour and egg sac of a pararchaeid species are described for the first time.

Introduction

The Pararchaeidae are a family of small to very small (3 mm or less in body length) entelegyne spiders known only from Australia and New Zealand. Most species are rare and usually cryptic in nature, and little is known of the biology of the group. Pararchaeid spiders are known only from humid microhabitats in forested regions. Most live within moss or thick leaf-litter, but some species are arboreal, living under tree bark or among dense foliage.

The family Pararchaeidae was erected by Forster and Platnick (1984) to include the then five Australian and two New Zealand species described in *Pararchaea* Forster, 1955. Two other families, the Holarchaeidae and the Mecysmaucheniidae, were also erected. The family Archaeidae (in which all three taxa were formerly placed) was relimited to include only three extant genera from South Africa, Madagascar and mainland Australia (Forster and Platnick 1984), with fossil Archaeidae known also from European Baltic amber and Cretaceous Burmese amber (Penney 2003). Rix (2005) described three new species of *Pararchaea*, taking the total number of described species to ten. Four species-groups were also proposed for the Australian species of *Pararchaea* based on morphology, although the monophyly of these groups was not tested.

The rarity of pararchaeid spiders (both in nature and in collections), and the limited amount of taxonomic work done on this family have hampered an understanding of the relationships among species and of the diversity of the group. In their revision of the archaeoid spiders, and in erecting the family Pararchaeidae, Forster and Platnick (1984: 71) stated that: 'Despite the undesirability of establishing family taxa for single genera, it is evident that as with other relict taxa…there is no other alternative'. This recognition of pararchaeid spiders as a distinct lineage, separate from other 'archaeid-like' spiders, was an important conceptual development. Pararchaeids have, however, long been viewed as merely a handful of unusual and relatively homogeneous species in a single genus. In contrast to this view, the Australian pararchaeid fauna is diverse at the generic and species levels, and with over fifty percent of species known from only one or two localities within a small geographic range, many more species may await discovery.

© CSIRO 2006
10.1071/IS05032 1445-5226/06/020203

The current revision is a comprehensive taxonomic and phylogenetic analysis of the family Pararchaeidae, and the first to examine the diversity of this group at a generic level. Six new genera and 24 new species are described, most from the mainland of Australia.

Materials and methods

All specimens were described and illustrated in 75% ethyl alcohol, or from scanning electron micrographs. Digital photographs were taken through binocular and compound microscopes with a Kodak EasyShare CX6330 digital camera (Tokyo, Japan), and dissected epigynes were temporarily mounted on glass cavity slides with 100% glycerine. Male genitalia and spinnerets were photographed using a Hitachi S-530 scanning electron microscope (Tokyo, Japan). Locality data were mapped using Biolink Version 2.0 (CSIRO Entomology; www.biolink.csiro.au, verified March 2006). All measurements were taken from an ocular micrometer and are expressed in millimeters. The sizes given (small, medium-sized and large) are expressed relative to body size variation within the family: small, carapace length less than 0.6 mm for males and less than 0.64 mm for females; medium-sized, carapace length less than 0.72 mm for males and less than 0.86 mm for females; large, carapace length larger than 0.72 mm for males and larger than 0.86 mm for females (see Fig. 17). All illustrations are by the author.

Character abbreviations used in text

AME	anterior median eyes
ALE	anterior lateral eyes
DS1*	dorsal sigillum 1 (anterior left)
DS2*	dorsal sigillum 2 (anterior right)
DS3*	dorsal sigillum 3 (posterior left)
DS4*	dorsal sigillum 4 (posterior right)
DSP1	dorsal sigilla pair 1 (anterior)
DSP2	dorsal sigilla pair 2 (posterior)
DSQ	dorsal sigilla quadrangle
PLE	posterior lateral eyes
PME	posterior median eyes
PTA	peg tooth group A
PTB	peg tooth group B
PTC	peg tooth group C
VS1	ventral sigillum 1 (anterior left)
VS2	ventral sigillum 2 (anterior right)
VS3	ventral sigillum 3 (posterior left)
VS4	ventral sigillum 4 (posterior right)
VSP1	ventral sigilla pair 1 (anterior)
VSP2	ventral sigilla pair 2 (posterior)
VSQ	ventral sigilla quadrangle

* also illustrated in figures

Character abbreviations used in figures

ALS	anterior lateral spinnerets
AT	anal tubercle
BH	basal haematodocha
C	conductor
CY	cymbium
DE	attached debris
DOP	dorsal outer process of paracymbium
E	embolus
FE	femur
IP	inner process of paracymbium
LF	lower flange on paracymbium
MAP	major ampullate gland spigots
mnS	mound-like cuticular sculpture
OP	outer process of paracymbium
P	paracymbium
PA	patella
PDF	prodistal flange
PI	piriform gland spigots
PLS	posterior lateral spinnerets
PMS	posterior median spinnerets
PS	paracymbial spur
RDA	retrodistal apophysis
RMA	retromedian apophysis
S	cuticular sculpture
SH	sheath for embolus
snS	spine-like cuticular sculpture
SP	spine-like outer process of paracymbium
spS	spur-like cuticular sculpture
STE	subtegulum
TE	tegulum
TI	tibia
VOP	ventral outer process of paracymbium
VP	pointed ventral process on paracymbium

Abbreviations of institutions

AMNH	American Museum of Natural History, New York, USA
AMS	Australian Museum, Sydney, Australia
CAS	California Academy of Sciences, San Francisco, USA
LRA	Landcare Research Collection, Auckland, New Zealand
MNZ	Tepapa Museum of New Zealand, Wellington, New Zealand
OMD	Otago Museum, Dunedin, New Zealand
QMB	Queensland Museum, Brisbane, Australia
QVM	Queen Victoria Museum, Launceston, Australia
SAM	South Australian Museum, Adelaide, Australia
WAM	Western Australian Museum, Perth, Australia

Systematics

Family **PARARCHAEIDAE** Forster & Platnick

Pararchaeidae Forster & Platnick, 1984: 65.
Type genus: *Pararchaea* Forster, 1955, by original designation.

Diagnosis

The Pararchaeidae can be distinguished from all other spider families except Archaeidae and Mecysmaucheniidae by the presence of elevated chelicerae which arise from a distinct, fully sclerotised foramen in the cephalothorax, and from both the Archaeidae and the Mecysmaucheniidae by having entelegyne female genitalia (Forster and Platnick 1984; Rix 2005). The Pararchaeidae can be further distinguished from the Archaeidae by the lack of an elongate neck region between the pars cephalica and pars thoracica (see Forster and Platnick 1984, fig. 213), and from the Mecysmaucheniidae by having six, rather than two, spinnerets.

Description

Modified from Rix (2005).

Cephalothorax. Carapace, when viewed laterally, rhomboidal. Pars cephalica rising steeply from pars thoracica above level of coxae III or IV; highest centrally or posteriorly, sloping towards eyes. Viewed dorsally, carapace rounded or oval with rounded lateral indentations; posterior,

procurved margin of pars cephalica appearing clearly demarcated from rest of carapace (see Rix 2005, figs 1–2). Carapace cuticle squamate, without tubercles or mounds. Eight eyes in two rows; laterals pearly-white, contiguous; AME usually slightly separated, dark-coloured; PME pearly-white, well separated from each other and from AME. Carapace mainly devoid of hairs, except on dorsal and dorsolateral aspects of pars cephalica and around eyes and clypeus. Anterior margin of carapace encircling bases of chelicerae, with sclerotised cuticle extending ventrally to form anteroventrally-facing oval foramen. Ventral suture below foramen completely or incompletely fused with sclerotised cuticle; if latter with thin longitudinal division. Sternum not much longer than wide, posteriorly obtuse; cuticle squamate, usually fused with posterior carapace around petiole. Maxillae directed across labium; serrula a single row of teeth. Labium triangular, wider than long; not rebordered.

Chelicerae. Paturon relatively long, proximally constricted; cuticle squamate. Pronounced keel extending down ventral surface of paturon. Fang relatively short, strongly curved. Promargin adjacent to fang usually with three groups (PTA, PTB, PTC) of stout peg teeth; PTA with 3–6 contiguous teeth directly adjacent to non-extended fang; PTC with three larger teeth on promargin of outer surface; PTB with 1–3 teeth between PTA and PTC. Outer surface of paturon of males with or without transverse stridulatory ridges. Retrolateral surface of paturon with strong, smooth, moveable hairs (see Fig. 144).

Legs and female pedipalp. Legs (longest to shortest: 4, 1, 2, 3) relatively short, cuticle squamate, clothed with slender serrate or smooth hairs; no spines or scopulae. Tarsi usually longer than metatarsi, with three claws. Tarsal organ capsulate. Femur I usually with proximal, dorsally curved row of retrolateral denticles (see Forster 1955, figs 15, 19). Female pedipalp entire, without claw; usually with several long, stiff hairs prolaterally.

Abdomen. Abdomen, when viewed dorsally, broadly oval or elongate-oval, without tubercles. Cuticle clothed with smooth or serrate hairs, each arising from small sclerotic plate; hairs absent from anterolateral faces of abdomen. Petiole encircled by sclerotised cuticle; cuticle extending posteriorly on males to cover epigastric region and anterior face of abdomen (forming anterior sclerite). Small to large, variably-shaped dorsal scute usually present on males; separate from or fused to anterior sclerite. Dorsal abdomen with anterior (DSP1) and posterior (DSP2) pair of oval or circular, small (DS1 and DS2) to large (DS3 and DS4) sigilla, forming quadrangle (DSQ) (see Fig. 55). Ventral abdomen also with anterior (VSP1) and posterior (VSP2) pair of subequal, circular sigilla (VS1–4) forming quadrangle (VSQ) (see Rix 2005, fig. 28). Book lung covers and external epigyne of females separately sclerotised; intromittent pores surrounded by an epigynal sclerite. Post-epigastric sclerites present on males and females; small and square or triangular on females, usually enlarged and fused to anterior sclerite on males (see Rix 2005, fig. 28). Six spinnerets, fully developed; usually encircled by sclerotised cuticle or surrounded dorsally and ventrally by separate sclerites. Posterior tracheal spiracle situated closely anterior to colulus, surrounded by extended spinneret sclerite, or by separate tracheal sclerite on females of most species.

Male genitalia. Male palpal patella and tibia without processes (see Fig. 89). Cymbium spoon-shaped with prominent retrolateral apophysis (paracymbium) proximally, of variable (species-specific) shape. Bulb large, extending over full length of cymbium; embolus spinous, arising from base and curving around prolateral margin of bulb (see Fig. 38). Sclerotised distal plate situated over bulb, distal to base of embolus; usually with conductor and various prolateral and/or retrolateral apophyses. Mound-like, spur-like or spine-like cuticular sculpture usually present on distal plate.

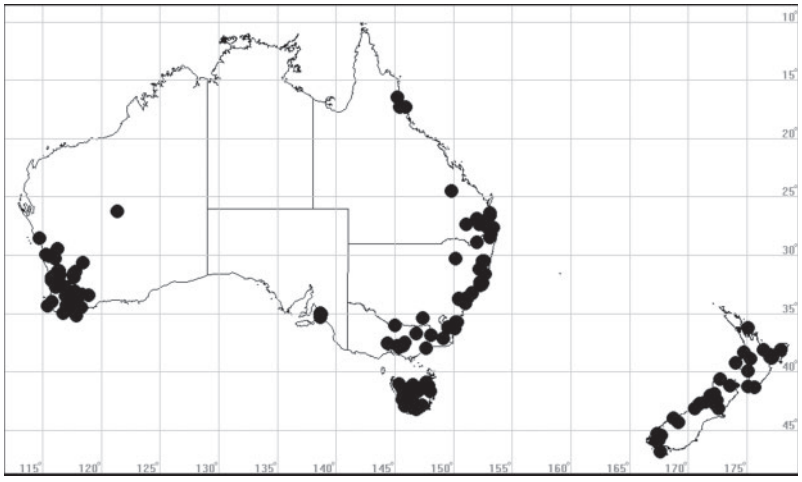


Fig. 1. Collection localities of adult Pararchaeidae in Australia and New Zealand.

Female genitalia. Epigyne with pair of separate, thick-walled, variously lobed receptacula, composed of internal systems of ducts and chambers; a single distinct fertilisation duct leads from each receptaculum into bursal cavity, bending outwardly or prolaterally (often only visible when cleared epigynes are viewed laterally).

Distribution

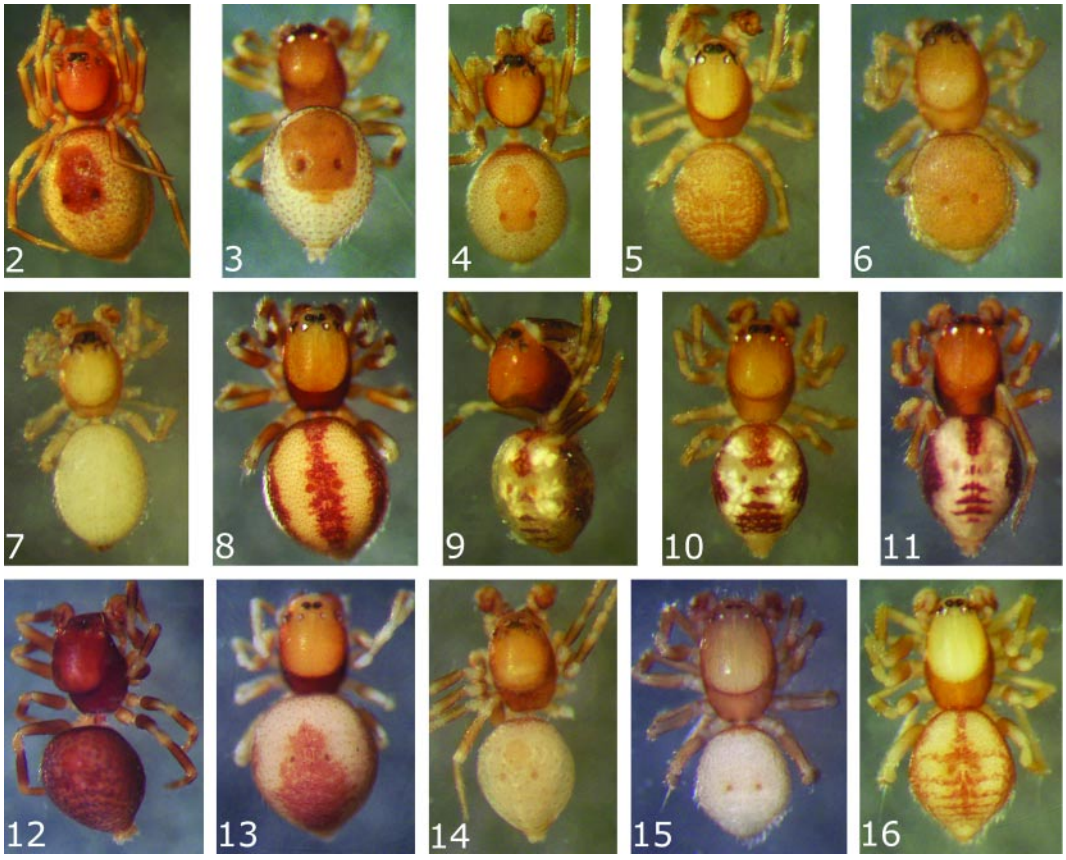
The Pararchaeidae are known only from Australia and New Zealand (Fig. 1).

Included genera

Anarchaea, gen. nov. (Figs 2–3); *Flavarchaea*, gen. nov. (Figs 4–5); *Forstrarchaea*, gen. nov. (Fig. 16); *Nanarchaea*, gen. nov. (Fig. 6); *Ozarchaea*, gen. nov. (Figs 8–14); *Pararchaea* Forster, 1955 (Fig. 15); *Westrarchaea*, gen. nov. (Fig. 7).

Key to the genera of Pararchaeidae (males required)

1. Retrolateral femur I without dorsally curved row of proximal denticles 2
   Retrolateral femur I with dorsally curved row of proximal denticles (see Forster 1955, figs 15, 19) 3
2. Male abdomen with large dorsal scute (Fig. 6); posterodorsal aspect of male pars cephalica with medial indentation (see Rix 2005, fig. 10); abdomen without extensive pigmentation; Australia . . . . . *Nanarchaea*, gen. nov.
   Male abdomen without dorsal scute; posterodorsal aspect of male pars cephalica without medial indentation; abdomen with extensive pigmentation (Fig. 16); New Zealand . . . . . *Forstrarchaea*, gen. nov.
3. Male abdomen with small to large dorsal scute 4
   Male abdomen without dorsal scute 6
4. Male dorsal scute large, dark brown in colour, surrounding DSQ and extending posterior to level of DSP2 (Figs 2–3); Australia . . . . . *Anarchaea*, gen. nov.
   Male dorsal scute small to large; if large, never dark brown in colour 5
5. Male embolus with remarkable leaf-like process distally, situated between conductor and prodistal flange on non-expanded pedipalp (Fig. 39); distal plate of male pedipalp



Figs 2–16. Habitus photographs of representative species of the genera of Pararchaeidae. *2*, *3*, *Anarchaea*: *2*, male *Anarchaea robusta*; *3*, male *Anarchaea falcata*. *4*,*5*, *Flavarchaea*: *4*, male *Flavarchaea lulu*; *5*, male *Flavarchaea hickmani*. *6*, Male *Nanarchaea bryophila*. *7*, Male *Westrarchaea spinosa*. *8–14*, *Ozarchaea*: *8*, female *Ozarchaea forsteri*; *9*, male *Ozarchaea werrikimbe*; *10*, male *Ozarchaea harveyi*; *11*, male *Ozarchaea ornata*; *12*, male *Ozarchaea valida*; *13*, female *Ozarchaea platnicki*; *14*, male *Ozarchaea spurgeon*. *15*, Male *Pararchaea alba*. *16*, Male *Forstrarchaea rubra*.

without cuticular sculpture (Fig. 45); retrolateral edge of cymbium with rounded triangular extension centrally, associated with row of descending hairs (Fig. 40); Australia . . . . . *Flavarchaea*, gen. nov.

Male embolus unmodified distally; distal plate of male pedipalp with cuticular sculpture (Figs 84, 88); retrolateral edge of cymbium without rounded triangular extension centrally or row of descending hairs; Australia, New Zealand . . . . . *Ozarchaea*, gen. nov. (part)

6. Body colour cream or yellow (Figs 7, 15) 7

Body colour dark brown (Fig. 12); Australia . . . . . *Ozarchaea*, gen. nov. (part)

7. AME reduced in size (Fig. 15; see Forster 1955, fig. 2); paracymbium without spine-like outer process (Fig. 129); New Zealand . . . . . *Pararchaea* Forster

AME not reduced (Fig. 7); paracymbium with spine-like outer process (Figs 132, 136, 140); Western Australia. . . . . *Westrarchaea*, gen. nov.

Genus ***Anarchaea***, gen. nov.

Type species: *Pararchaea corticola* Hickman, 1969.

Diagnosis

Species of *Anarchaea* can be distinguished from all other Pararchaeidae by the presence of a large, dark brown dorsal scute on the male abdomen (surrounding DSQ and extending posterior to level of DSP2; Figs 2–3), and proximal retrolateral denticles on leg I. Males further distinguished from other pararchaeid genera by the presence of separate dorsal and ventral sclerotised plates surrounding the anal tubercle and spinnerets (see Rix 2005, fig. 28).

Description

Medium-sized to large Pararchaeidae (Fig. 17), brown and beige or yellow in colour, widely distributed in south-eastern Australia.

Cephalothorax. Carapace, when viewed laterally, rhomboidal. Eight eyes in two rows; laterals pearly-white, contiguous; AME separated, dark-coloured; PME pearly-white, well separated from each other and from AME.

Chelicerae. Promargin adjacent to fang with three groups (PTA, PTB, PTC) of stout peg teeth; PTA with 5–6 contiguous teeth directly adjacent to non-extended fang; PTC with three larger teeth on promargin of outer surface; PTB with 2–3 teeth between PTA and PTC. Outer surface of paturon of males with or without transverse stridulatory ridges (see Hickman 1969, fig. 10).

Legs. Femur I with proximal, dorsally curved row of retrolateral denticles.

Abdomen. Abdomen, when viewed dorsally, broadly oval or elongate-oval, without tubercles. Large, dark brown dorsal scute present on males; separate from or fused to anterior sclerite (Figs 2–3). Post-epigastric sclerites present on males and females; small and square or triangular on females, enlarged on males. Six spinnerets, fully developed; surrounded dorsally and ventrally by separate sclerites. Posterior tracheal spiracle situated closely anterior to colulus, surrounded by extended spinneret sclerite, or by separate tracheal sclerite on females.

Male genitalia. Male palpal patella and tibia without processes. Cymbium spoon-shaped with prominent retrolateral apophysis (paracymbium) proximally, of variable (species-specific) shape. Paracymbium usually with divergent inner and outer processes (Figs 20, 24). Bulb large, extending over full length of cymbium; embolus spinous, arising from base and curving around prolateral margin of bulb. Sclerotised distal plate situated over bulb, distal to base of embolus. Distal plate with large distal apophysis forming conductor (Fig. 19), small prodistal flange, and prolateral sheath around embolus. Mound-like, spur-like or

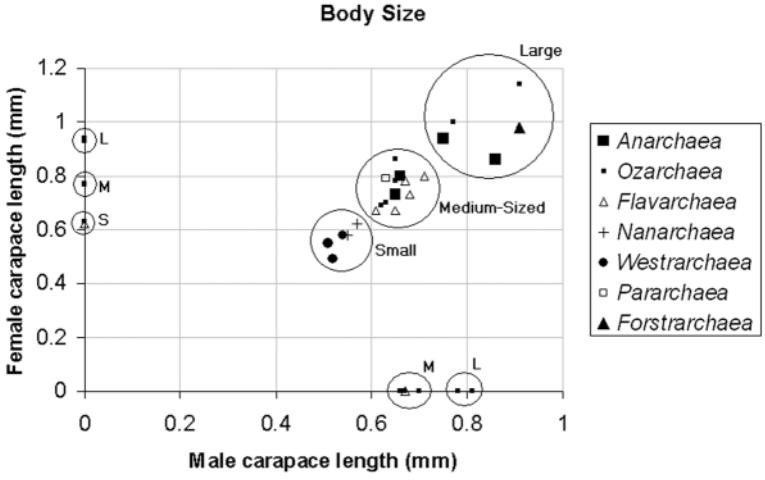


Fig. 17. Graph illustrating different body size classes for species of Pararchaeidae. The carapace lengths of the type specimens of each species are plotted, with different symbols for each genus.

spine-like cuticular sculpture present on distal plate (Fig. 21).

Female genitalia. Epigyne with pair of separate, thick-walled, variously lobed receptacula (Figs 29–31), composed of internal systems of ducts and chambers; a single distinct fertilisation duct leads from each receptaculum into bursal cavity.

Distribution

Species of *Anarchaea* are known from south-eastern Australia, from south-eastern Queensland to Tasmania.

Etymology

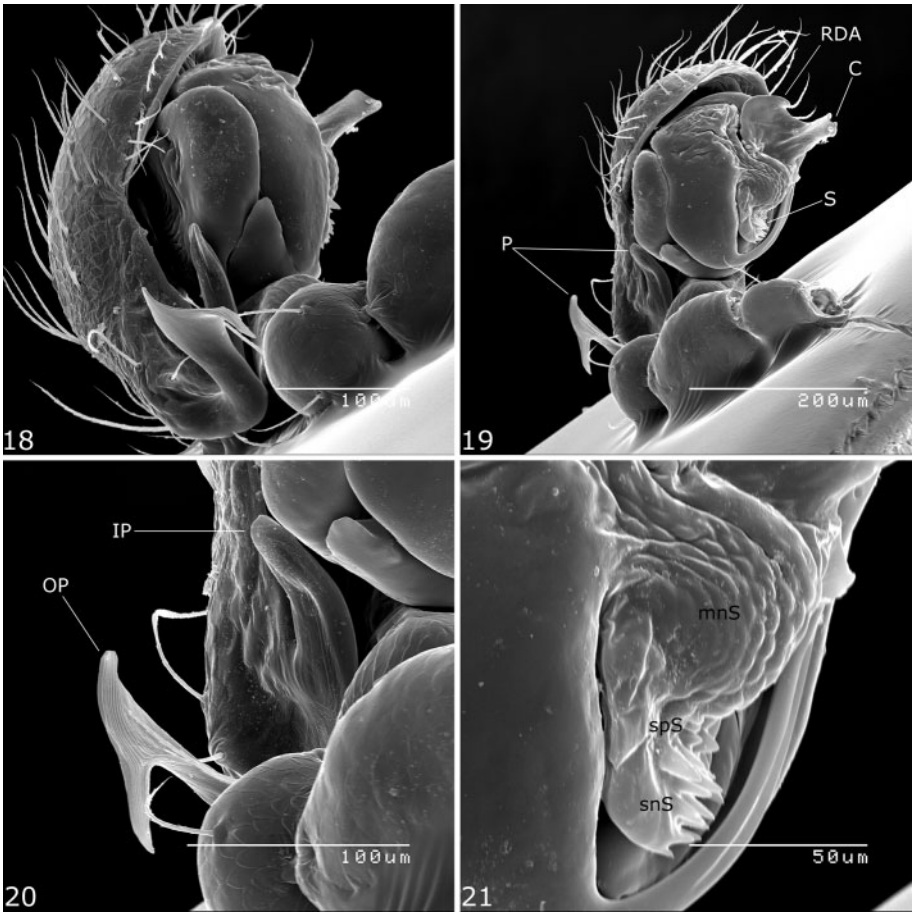
The generic name is derived from the Greek prefix ‘an’, meaning ‘not’, and refers to the separation of this genus from other pararchaeid taxa. The gender is considered feminine.

Included species

Anarchaea corticola (Hickman, 1969), *A. falcata*, sp. nov., *A. raveni*, sp. nov., *A. robusta* (Rix, 2005).

Key to species of *Anarchaea*

1. Males 2
   Females 5
2. Dorsal scute roughly square-shaped, much wider than DSP2 at level of DSP2 (Fig. 3) 3
   Dorsal scute roughly as wide as DSP2 at level of DSP2 (Fig. 2); Tasmania . . . . . *A. robusta* (Rix)
3. Outer process of paracymbium sickle-shaped (Fig. 20); New South Wales . . . . . *A. falcata*, sp. nov.
   Paracymbium not sickle-shaped 4
4. Cymbium with retrolateral, lobe-like extension adjacent to paracymbium (see Hickman 1969, fig. 11; Rix 2005, fig. 12); adult body size large; Tasmania . . . . *A. corticola* (Hickman)
   Cymbium without retrolateral, lobe-like extension; adult body size medium-sized; Queensland . . . . . *A. raveni*, sp. nov.
5. External epigyne distinctive, as illustrated in Fig. 28; Tasmania . . . . . *A. corticola* (Hickman)
   External epigyne not as in Fig. 28 6
6. Receptacula posteriorly convergent (Figs 29, 30) 7
   Receptacula not posteriorly convergent, with multiple rounded lobes (Fig. 31); Queensland . . . . . *A. raveni*, sp. nov.
7. Adult body size large; Tasmania. . . . . *A. robusta* (Rix)
   Adult body size medium-sized; New South Wales. . . . . *A. falcata*, sp. nov.



Figs 18–21. Scanning electron micrographs of male right pedipalp of *Anarchaea falcata*: *18*, retrolateral view; *19*, retroventral view; *20*, detail of paracymbium, retroventral view; *21*, detail of cuticular sculpture, retroventral view.

Anarchaea corticola (Hickman), comb. nov.

(Figs 28, 35)

Pararchaea corticola Hickman, 1969: 3, figs 10–15. – Forster & Platnick, 1984: 71; Rix, 2005: 139, figs 8, 12.

Material examined

Holotype. ♂, Australia, Tasmania, Hobart, The Queen's Domain, under the loose bark of eucalypts, 42°52′S, 147°19′E, 24.v.1937, V. V. Hickman (AMS KS6635).

Paratypes. **Tasmania:** allotype ♀, same data as holotype except iii.1955 (AMS KS6636).

Diagnosis

Distinguished from other congeners by the following combination of characters: male dorsal scute wider than DSP2 at the level of DSP2 (see Hickman 1969, fig. 12); cymbium with retrolateral lobe-like extension adjacent to paracymbium (see Hickman 1969, fig. 11; Rix 2005, fig. 12); oval sclerite surrounding VSP2 on males; shape of female external epigyne distinctive (Fig. 28).

Distribution and habitat

Known only from the Queen's Domain, Hobart, Tasmania (Fig. 35). Hickman (1969) recorded that the type specimens were collected from under the loose bark of eucalypts. This species may now be extinct (see Conservation of Pararchaeidae, below).

Anarchaea falcata, sp. nov.

(Figs 3, 18–21, 30, 35)

Material examined

Holotype. ♂, Australia, New South Wales, Myall Lakes National Park, pitfall trap, 32°34′45″S, 152°17′27″E, 24.v.1998, L. Wilkie (AMS KS58500).

Paratypes. **New South Wales:** allotype ♀, Bulls Ground State Forest, litter, 31°35′S, 152°41′E, iv.2000, A. York (AMS KS89717); 1♀, same data (AMS KS77905); 1♂, same data (AMS KS89714); 1♀, same data except xi.2000 (AMS KS89667); 1♂, 1♀, same data except iii.1996 (AMS KS77899); 1♂, same data (AMS KS77902); 1♂, same data (AMS KS77900); 1♂, same data (AMS KS77901); 1♂, same data (AMS KS89716); 2♂, same data (AMS KS77903); 1♂, same data except ii.1994 (AMS KS77904); 1♂, same data as holotype except 30.iv.1997 (AMS KS60648).

Diagnosis

Distinguished from other congeners by the following combination of characters: male dorsal scute broad, roughly square-shaped (Fig. 3); outer process of paracymbium sickle-shaped (Fig. 20); female receptacula posteriorly-convergent (Fig. 30).

Description

Male (*holotype*). Body size: medium-sized. Total length 1.69. Carapace 0.65 long, 0.49 wide. Abdomen 1.04 long, 0.80 wide. Colour: carapace brown; pars thoracica darkest. Abdomen beige, with dark brown dorsal scute. Legs mustard-yellow; femora, tibiae and metatarsi darker brown proximally. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges present on outer surface. Dentition: PTA 5, PTB 2, PTC 3 (10). Abdomen: post-epigastric sclerites fused to anterior sclerite; extending to level of VSP1. Large, broad, square-shaped dorsal scute, extending from behind posterior margin of anterior sclerite to length of DSQ behind DSP2 (Fig. 3). Spinnerets surrounded by sclerotised cuticle dorsally and ventrally, extending ventrally up to length of VSQ from latter. Pedipalp (AMS KS77903; Figs 18–21): paracymbium with large sickle-shaped outer process and simple rounded inner process. Distal plate with large distal conductor, small retrodistal apophysis and small prodistal flange. Cuticular sculpture of distal plate: cluster of 10 spine-like projections near base of embolus, several spur-like projections, and mound-like lumps extending to base of conductor. Legs: femur I with dorsally curved row of six retrolateral denticles.

Female (*allotype*). Body size: medium-sized. Total length 2.06. Carapace 0.73 long, 0.56 wide. Abdomen 1.33 long, 1.08 wide. Colour: carapace brown; pars thoracica darkest. Abdomen beige-yellow. Legs light mustard-yellow; femora, tibiae, metatarsi and tarsi darker brown proximally. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 6, PTB 3, PTC 3 (12). Abdomen: spinnerets surrounded by sclerotised cuticle dorsally and ventrally; cuticle medially constricted ventrally. Tracheal sclerite present. Epigyne (AMS KS89667; Fig. 30): receptacula rounded, cone-shaped; posteriorly convergent. Legs: femur I with dorsally curved row of six retrolateral denticles.

Distribution and habitat

Known from eastern New South Wales, from Myall Lakes National Park north of Sydney, north to Bulls Ground State Forest near Port Macquarie (Fig. 35).

Etymology

The specific epithet is derived from the Latin adjective 'falcatus', meaning sickle-shaped, and refers to the distinctive shape of the paracymbium of this species.

Anarchaea raveni, sp. nov.

(Figs 22–25, 31, 35, 144–146)

Material examined

Holotype. ♂, Australia, Queensland, Redbank Plains, near Goodna, leaf litter, 27°39′S, 152°52′E, 7.iv.2001, M. Rix (QMB S66818).

Paratypes. **Queensland:** allotype ♀, same data as holotype (QMB S66819); 1♀, same data (QMB S66820); 1♂, same data (QMB

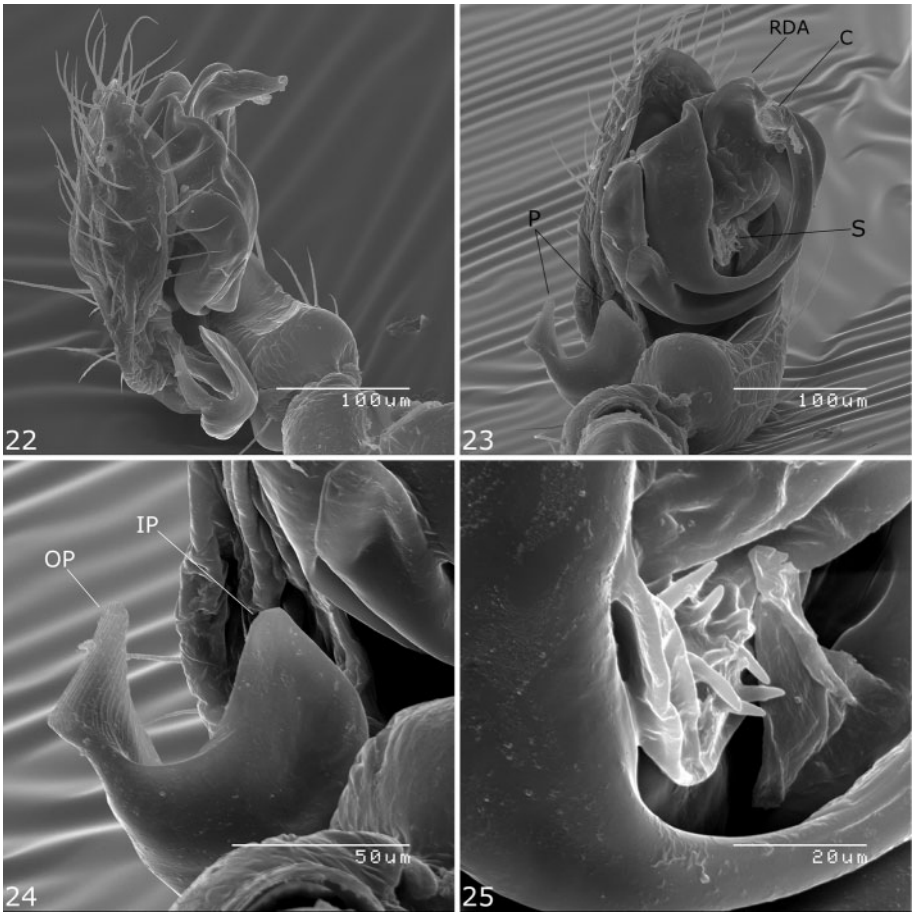
S66821); 1♀, same data except 7.xii.2000 (QMB S66822); 1♀, same data except 1.vi.2002 (QMB S66824); 2♀, same data except 14.ix.2002 (QMB S66823); 1♀, Peregian Beach, near Coolum, leaf litter, 26°33′S, 153°05′E, 16.vi.2001, M. Rix (QMB S66832); 1♀, Whites Hill Reserve, Brisbane, leaf litter, 27°30′S, 153°05′E, 9.x.2001, M. Rix (QMB S66827); 1♀, 2♂, same data except 12.iv.2001 (QMB S66828); 2♀, Venman Bushland National Park, *Allocasuarina* leaf litter, 27°37′S, 153°12′E, 22.iv.2002, M. Rix (QMB S66831); 1♀, Ravensbourne National Park, leaf litter above entrance to 'Caves', 27°21′S, 152°11′E, 30.ix.2001 (QMB S66825); 1♂, same data except 19.iv.2001 (QMB S66826); 1♀, misidentified paratype of *Pararchaea binnaburra* Forster, 1955 from Binna Burra, Lamington Plateau, ex leafmould, 28°11′S, 153°10′E, 7.ix.1952, T. E. Woodward (QMB S66829); 1♂, Ewan Maddock Dam, open forest pitfall, 26°48′S, 152°59′E, 3.v–22.viii.1993, M. Glover (QMB S62171); 1♂, Noosa National Park, in scribbly gum eucalypt leaf litter, 26°23′S, 153°05′E, 5.iv.2002, M. Rix (QMB S66830); 1♂, Maidenwell Road State Forest, rainforest sieved litter, 26°50′S, 151°59′E, J. Gallon, G. Thompson (QMB S62171); 1♂, Gold Creek Reservoir, pitfall in spotted gum open forest, 27°27′54″S, 152°52′30″E, 30.vi–28.vii.2003 (QMB S62171).

Diagnosis

Distinguished from other congeners by the following combination of characters: male dorsal scute broad, roughly square-shaped (Fig. 3); paracymbium with two broad processes (Fig. 24); cymbium without proximal lobe-like extension; female receptacula heart-shaped (Fig. 31).

Description

Male (*holotype*). Body size: medium-sized. Total length 1.66. Carapace 0.66 long, 0.47 wide. Abdomen 1.00 long, 0.78 wide. Colour: carapace brown; pars thoracica darkest. Abdomen beige, with dark brown dorsal scute. Legs mustard-yellow; tibiae and metatarsi darker brown proximally. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 6, PTB 3, PTC 3 (12). Abdomen: post-epigastric sclerites fused to anterior sclerite; extending to level just anterior to VSP1. Large, broad, square-shaped dorsal scute, extending from behind posterior margin of anterior sclerite to length of DSQ behind DSP2. Spinnerets surrounded by sclerotised cuticle dorsally and ventrally, extending ventrally up to length of VSQ from latter. Pedipalp (QMB S66830; Figs 22–25): paracymbium with two broad processes; outer process more



Figs 22–25. Scanning electron micrographs of male right pedipalp of *Anarchaea raveni*: *22*, retrolateral view; *23*, retroventral view; *24*, detail of paracymbium, retroventral view; *25*, detail of cuticular sculpture, retroventral view. Note cymbium is slightly shrunken.

acutely pointed distally than inner process. Distal plate with large distal conductor, small retrodistal apophysis and small prodistal flange. Cuticular sculpture of distal plate: cluster of 10 spine-like projections near base of embolus. Legs: femur I with dorsally curved row of seven retrolateral denticles.

Female (*allotype*). Body size: medium-sized. Total length 1.91. Carapace 0.80 long, 0.55 wide. Abdomen 1.11 long, 0.88 wide. Colour: pars cephalica mustard-yellow, pars thoracica brown. Abdomen beige-yellow. Legs light mustard-yellow; femora, tibiae, metatarsi and tarsi darker proximally. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 6, PTB 3, PTC 3 (12). Abdomen: spinnerets surrounded by sclerotised cuticle dorsally and ventrally; cuticle medially constricted ventrally. Tracheal sclerite present. Epigyne (QMB S66832; Fig. 31): receptacula heart-shaped, rounded outwardly, with inner lobes; inner lobes just touching medially. Legs: femur I with dorsally curved row of six retrolateral denticles.

Distribution and habitat

Known from south-eastern Queensland (Fig. 35), where it is widespread and relatively common in thick leaf litter, especially eucalypt or she-oak (*Allocasuarina* spp.) leaf litter that has accumulated at the bases of trees. This species survives in several bushland reserves in suburban Brisbane, where it is sometimes locally sympatric with *Flavarchaea anzac*.

Etymology

The specific epithet is a patronym in honour of Dr Robert Raven, for his invaluable instruction over many years.

Anarchaea robusta (Rix), comb. nov.

(Figs 2, 29, 35)

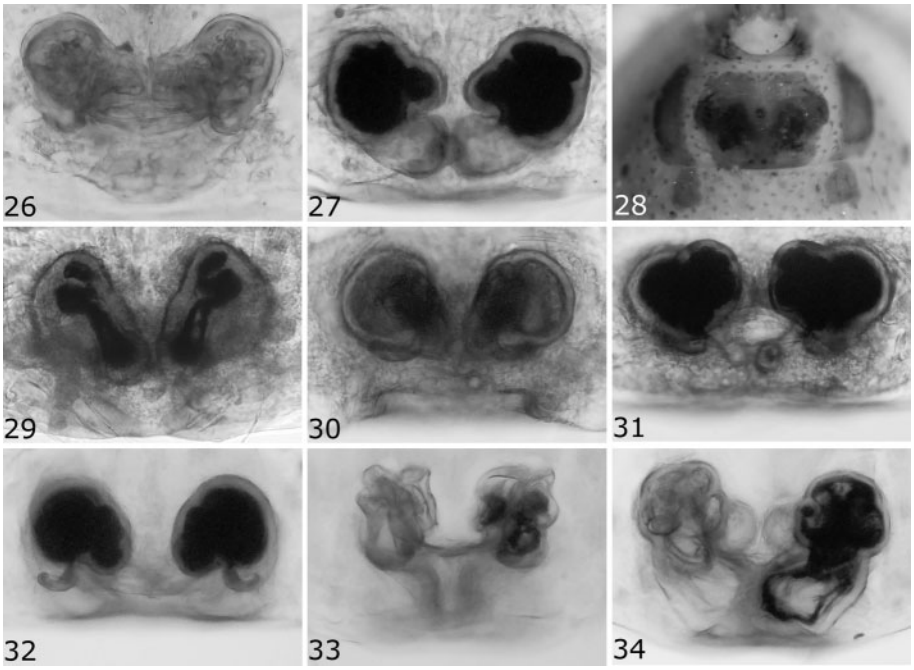
Pararchaea robusta Rix, 2005: 145, figs 5, 24–28.

Material examined

Holotype. ♂, Australia, Tasmania, 1.5 km west of Gordon River Road, Frodshams Pass, Scotts Peak Road, *Nothofagus cunninghamii* Sample 8, 42°49′S, 146°13′E, 15.ii.1990, R. Coy, P. Lillywhite, A. Yen (NMV K8796).

Paratypes. **Tasmania:** allotype ♀, same data as holotype (NMV K8797).

Other material examined. **Tasmania:** 1♀, Mount Wedge Track, sweeping, 42°50′S, 146°17′E, 7.i.1998, L. J. Boutin (QVM 13: 24033); 1♀, Liffey Falls, in moss, 41°40′S, 146°56′E, 22.i.1953, J. L. Hickman, V. V. Hickman (AMS KS28713); 1♂, Florentine Valley, pyrethrum fogging *Nothofagus cunninghamii* bark, 42°54′S, 147°13′E, 1/6.ii.1980, A. Newton, M. Thayer (AMNH); 2♀, The Gap, Florentine Road, pyrethrum fogging tree ferns, 42°54′S, 147°13′E, 1.ii.1980, A. Newton, M. Thayer (AMNH); 1♂, Gordon River Road, pyrethrum



Figs 26–34. Female epigynes of species of *Nanarchaea*, *Anarchaea* and *Westrarchaea*. *26–27*, *29–34*, Receptacula, dorsal view: *26, Nanarchaea binnaburra*; *27*, *Nanarchaea bryophila*; *29, Anarchaea robusta*; *30*, *Anarchaea falcata*; *31*, *Anarchaea raveni*; *32*, *Westrarchaea spinosa*; *33*, *Westrarchaea sinuosa*; *34*, *Westrarchaea pusilla*. *28*, *Anarchaea corticola* external epigyne, ventral view.

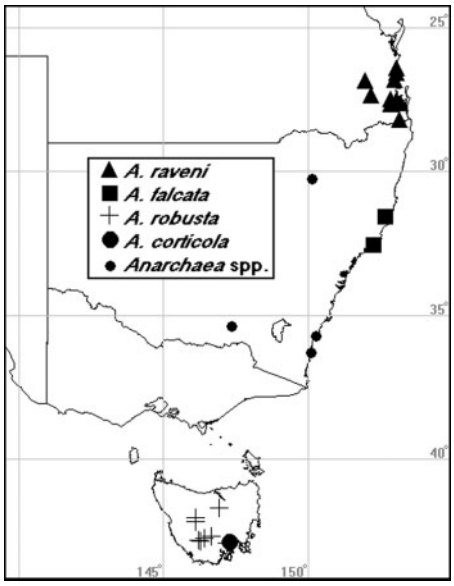


Fig. 35. Collection localities for species of *Anarchaea* in south-eastern Australia. Note the distribution of undescribed female specimens.

fogging tree ferns, 42°44′S, 146°25′E, 3.ii.1980, A. Newton, M. Thayer (AMNH); 1♀, Rufus Canal, *Nothofagus* rainforest, 42°10′S, 146°07′E, 28.i.1980, A. Newton, M. Thayer (AMNH); 1♀, west side, Lake St Clair, pyrethrum fogging tree ferns, 42°02′S, 146°07′E, 25–29.i.1980, A. Newton, M. Thayer (AMNH).

Diagnosis

Distinguished from other congeners by the following combination of characters: male dorsal scute as wide as DSP2 at level of DSP2 (Fig. 2); male post-epigastric sclerites very large (see Rix 2005, fig. 28); paracymbium a single, curved apophysis (see Rix 2005, figs 25–26); female receptacula posteriorly-convergent (Fig. 29).

Distribution and habitat

Known from Tasmania, where it is widespread (Fig. 35). This species lives in moss and leaf litter, and may also occur on tree ferns.

Anarchaea spp.

In the absence of males, the following female specimens could not be confidently described or accurately diagnosed as existing species.

Material examined

New South Wales. 1♀, Murramarang State Forest, North Head Road, 35°42′25″S, 150°16′30″E, 17.iii.1999, R. Harris, H. Smith (AMS KS59220); 1♀, Corunna State Forest, Princes Highway, 36°16′48″S, 150°07′33″E, 12.iii.1999, R. Harris, H. Smith (AMS KS59217); 1♀, Mount Kaputar National Park, Killarney Gap, sieved litter in open forest, 30°16′S, 150°10′E, 27.vi.1991, D. Black (WAM T46257); 1♀, Livingstone National Park, beating understory, 35°22′S, 147°22′E, 30.x.2000, C. Car (WAM T63293).

Genus ***Flavarchaea***, gen. nov.

Type species: *Pararchaea lulu* Rix, 2005.

Diagnosis

Species of *Flavarchaea* can be distinguished from all other Pararchaeidae by the presence of a retrolateral cymbial extension (with associated row of descending hairs; Figs 40, 44, 52), and a modified embolus on the male pedipalp (with remarkable leaf-like process distally; Figs 38–39). Further distinguished from other pararchaeid genera by the absence of cuticular sculpture on the male pedipalp (Fig. 45).

Description

Small to medium-sized Pararchaeidae (Fig. 17), cream, yellow or mustard-yellow in colour, widely distributed in Australia.

Cephalothorax. Carapace, when viewed laterally, rhomboidal. Eight eyes in two rows; laterals pearly-white, contiguous; AME separated, dark-coloured; PME pearly-white, well separated from each other and from AME.

Chelicerae. Promargin adjacent to fang with three groups (PTA, PTB, PTC) of stout peg teeth; PTA with five teeth directly adjacent to non-extended fang; PTC with three larger teeth on promargin of outer surface; PTB with 2–3 teeth between PTA and PTC. Outer surface of paturon of males with transverse stridulatory ridges.

Legs. Femur I with proximal, dorsally curved row of retrolateral denticles.

Abdomen. Abdomen, when viewed dorsally, elongate-oval, without tubercles. Small and circular to large and rectangular dorsal scute present on males; separate from or fused to anterior sclerite (Figs 4–5, 43, 47, 51, 55). Post-epigastric sclerites present on males and females; small and square or triangular on females, enlarged on males. Six spinnerets, fully developed; encircled by sclerotised cuticle, surrounded dorsally and ventrally by separate sclerites, or not surrounded by sclerotised cuticle. Anterior lateral spinnerets of male each with two major ampullate gland spigots and five piriform gland spigots (Figs 36–37). Posterior median spinnerets of male each with two aciniform gland spigots (Fig. 36). Posterior lateral spinnerets of male each with two aciniform gland spigots; triad (two aggregate gland spigots plus a flagelliform gland spigot) absent (Fig. 36). Posterior

tracheal spiracle situated closely anterior to colulus, surrounded by extended spinneret sclerite, or by separate tracheal sclerite on females.

Male genitalia. Male palpal patella and tibia without processes. Cymbium spoon-shaped with prominent retrolateral apophysis (paracymbium) proximally, of variable (species-specific) shape. Paracymbium with distal 'cup-shaped' region formed by short inner process, and dorsal and ventral outer processes (Figs 42, 46, 50, 54). Retrolateral edge of cymbium with rounded triangular extension associated with row of descending hairs (Figs 40, 44, 52). Bulb large, extending over full length of cymbium; embolus spinous, arising from base and curving around prolateral margin of bulb, with remarkable leaf-like process distally (Fig. 39). Sclerotised distal plate situated over bulb, distal to base of embolus. Distal plate with distal apophysis forming conductor, large curved prodistal flange, prolateral sheath around embolus, and small to large retromedian apophysis (Fig. 48). Cuticular sculpture absent on distal plate (Fig. 45).

Female genitalia. Epigyne with pair of separate, thick-walled, variously lobed receptacula (Figs 58–64), composed of internal systems of ducts and chambers; a single distinct fertilisation duct leads from each receptaculum into bursal cavity.

Distribution

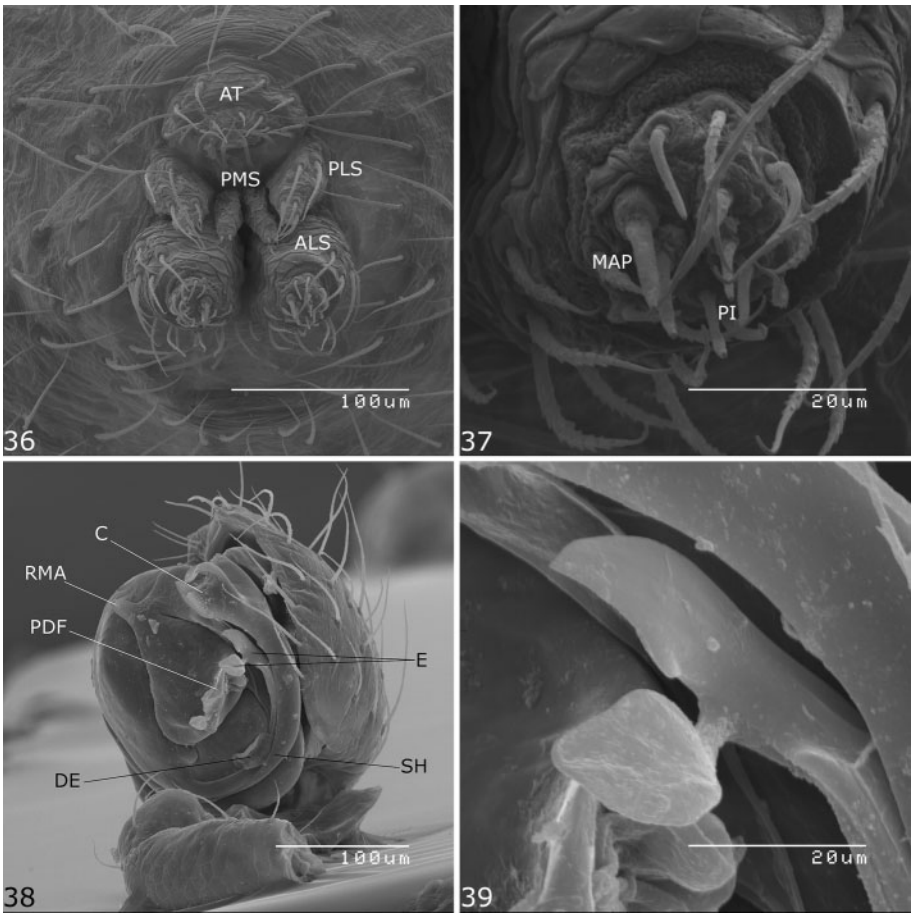
Species of *Flavarchaea* are known from Australia, from north-eastern Queensland to Tasmania, in south-eastern South Australia, and in south-western Western Australia.

Etymology

The generic name is derived from the Latin adjective 'flavus', meaning yellow, and refers to the body colour of species in this genus. The gender is considered feminine.

Included species

Flavarchaea anzac, sp. nov., *F. badja*, sp. nov., *F. barmah*, sp. nov., *F. hickmani* (Rix, 2005), *F. lofty*, sp. nov., *F. lulu* (Rix, 2005), *F. stirlingensis*, sp. nov.

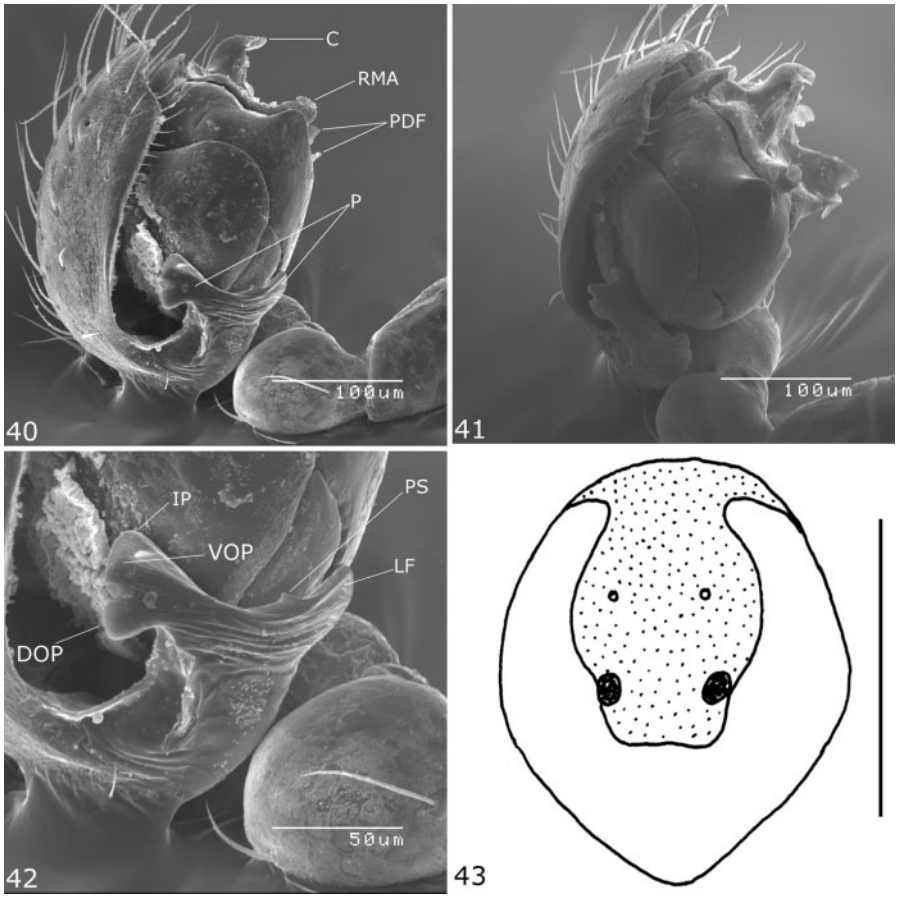


Figs 36–39. Scanning electron micrographs of *Flavarchaea* species. *36–37*, Spinnerets of juvenile male *Flavarchaea* species from Tasmania: *36*, spinnerets, posterior view; *37*, detail of ALS, posterior view. *38–39*, Right male pedipalp of *Flavarchaea lofty*: *38*, pedipalp, proventral view; *39*, detail of tip of embolus.

Key to species of *Flavarchaea*

*Males of *F. stirlingensis* are unknown

1. Males 2
   Females 7
2. Dorsal scute large, extending posterior to level of DSP2 (Figs 4, 43, 47) 3
   Dorsal scute small, not extending posterior to level of DSP2 (Figs 5, 51, 55) 5
3. Dorsal scute broadly fused to anterior sclerite (Figs 47, 51) . . 4
   Dorsal scute separate from or only just fused to anterior sclerite (Fig. 4); Tasmania . . . . . *F. lulu* (Rix)
4. Small spur on paracymbium situated centrally between distal tip of paracymbium and tip of lower flange (Fig. 46); New South Wales . . . . . *F. badja*, sp. nov.
   Small spur on paracymbium situated at base of lower flange, closer to tip of lower flange than to distal tip of paracymbium (Fig. 42); Queensland. . . . . *F. anzac*, sp. nov.
5. Dorsal scute fused to anterior sclerite (Fig. 51); New South Wales and Victoria . . . . . *F. barmah*, sp. nov.
   Dorsal scute separate from anterior sclerite 6
6. Dorsal scute circular (Fig. 5); Tasmania . . . . . *F. hickmani* (Rix)
   Dorsal scute rectangular (Fig. 55); South Australia . . . . . *F. lofty*, sp. nov.
7. Receptacula with distinctive ‘nose-like’ inner lobes (Figs 58–62) 8
   Receptacula without distinctive ‘nose-like’ inner lobes (Fig. 63); Tasmania . . . . . *F. hickmani* (Rix)
8. Receptacula oriented anteriorly, visible in profile in dorsal view 9
   Receptacula oriented anterodorsally, not visible in profile in dorsal view (Fig. 58); Western Australia. . . . . *F. stirlingensis*, sp. nov.
9. ‘Nose-like’ inner lobes of receptacula directed medially or posteriorly (Figs 59–62) 10
   ‘Nose-like’ inner lobes of receptacula directed anteriorly (Fig. 64); South Australia. . . . . *F. lofty*, sp. nov.
10. Receptacula with distinctive lateral indentation opposite each ‘nose-like’ inner lobe (Fig. 60); New South Wales. . . . . *F. badja*, sp. nov.
    Receptacula without distinctive lateral indentation opposite each ‘nose-like’ inner lobe (Figs 59, 61–62). 11
11. Anterior margins of receptacula strongly incised at bases of ‘nose-like’ inner lobes (Fig. 59); Queensland. . . . . *F. anzac*, sp. nov.
    Anterior margins of receptacula not strongly incised at bases of ‘nose-like’ inner lobes (Figs 61–62) 12
12. Adult body size large; femur I with four retrolateral denticles; Tasmania . . . . . *F. lulu* (Rix)
    Adult body size medium-sized; femur I with five retrolateral denticles; New South Wales . . . . . *F. barmah*, sp. nov.



Figs 40–43. *Flavarchaea anzac*. *40–42*, Scanning electron micrographs of male right pedipalp: *40*, retrolateral view; *41*, retroventral view; *42*, detail of paracymbium, retrolateral view. *43*, Male abdomen and dorsal scute, anterodorsal view. Unmarked scale bar = 0.5 mm.

Flavarchaea anzac, sp. nov.

(Figs 40–43, 59, 65)

Material examined

Holotype. ♂, Australia, Queensland, Brisbane, Burbank, J. C. Trotter Memorial Park, sifted from *Allocasuarina* leaf litter next to lake, 27°33′S, 153°11′E, 10.vi.2001, M. Rix (QMB S66834).

Paratypes. **Queensland:** allotype ♀, same data as holotype (QMB S66835); 1♀, same data (QMB S66836); 1♂, Redbank Plains, near Goodna, wet litter in gully, 27°39′S, 152°52′E, 26.v.2002, M. Rix (QMB S66837); 1♂, Whites Hill Reserve, Brisbane, *Casuarina* leaf litter, 27°30′S, 153°05′E, 2.vi.2001, M. Rix (QMB S66838); 1♂, Peregian Beach, near Coolum, leaf litter, 26°33′S, 153°05′E, 16.vi.2001, M. Rix (QMB S66840); 1♂, Neville Lawrie Reserve, Daisy Hill, *Casuarina* leaf litter, 27°37′S, 153°11′E, 25.iv.2001, M. Rix (QMB S66839).

Diagnosis

Distinguished from other congeners by the following combination of characters: male dorsal scute large, broadly fused to anterior sclerite (Fig. 43); paracymbium with lower flange and paracymbial spur (Fig. 42); spur on paracymbium situated closer to tip of lower flange than to distal tip of paracymbium (Fig. 42).

Description

Male (*holotype*). Body size: medium-sized. Total length 1.44. Carapace 0.65 long, 0.45 wide. Abdomen 0.79 long, 0.59 wide. Colour: carapace mustard-yellow. Abdomen beige-yellow, with mustard-yellow dorsal scute. Legs pale mustard-yellow. Carapace: dorsal surface of pars cephalica relatively flat, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges present on outer surface. Dentition: PTA 5, PTB 2, PTC 3 (10). Abdomen: post-epigastric sclerites fused to anterior sclerite. Large, rectangular dorsal scute, broadly fused to anterior sclerite and extending posteriorly to half length of DSQ from DSP2 (Fig. 43). Spinnerets encircled by sclerotised cuticle, extending ventrally up to length of VSQ from latter. Pedipalp (QMB S66840; Figs 40–42): paracymbium distally cup-shaped, with pronounced lower flange; small spur situated closer to tip of lower flange than to distal tip of paracymbium. Distal cup-shaped region of paracymbium with short rounded inner process and pronged, spur-like dorsal and ventral outer processes; without pointed ventral process. Distal plate with distal conductor, large mound-like retromedian apophysis, and distally-pointed, triangular prodistal apophysis with large proximal spur. Embolus with leaf-like process distally. Legs: femur I with dorsally-curved row of five retrolateral denticles.

Female (*allotype*). Body size: medium-sized. Total length 1.84. Carapace 0.67 long, 0.46 wide. Abdomen 1.17 long, 0.88 wide. Colour: carapace mustard-yellow. Abdomen cream. Legs pale mustard-yellow. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 5, PTB 3, PTC 3 (11). Abdomen: spinnerets surrounded by sclerotised cuticle dorsally and ventrally; cuticle medially constricted ventrally. Tracheal sclerite present. Epigyne (QMB S66836; Fig. 59): receptacula rounded, with prominent ‘nose-like’ inner lobes. Legs: femur I with dorsally-curved row of five retrolateral denticles.

Distribution and habitat

Known from south-eastern Queensland, from the Sunshine Coast (Noosa and surrounding areas) south to Brisbane (Fig. 65). This species lives in thick, moist leaf litter, especially the carpet-like layer that forms beneath dense stands of she-oak trees (*Allocasuarina* spp.). It also occurs within eucalypt bark and leaf litter that accumulates at the bases of trees, especially in coastal areas. This species survives in several bushland reserves in suburban Brisbane, where it is sometimes locally sympatric with *Anarchaea raveni*.

Etymology

The specific epithet refers to Australia’s national day of wartime commemoration, ‘Anzac Day’ (annually on 25 April). This date remembers and honours all Australians who have served and died in war, and originated after Australian and New Zealand Army Corps (‘Anzac’) soldiers landed at the Gallipoli Peninsula, Turkey, on 25 April 1915. The first specimen of this species (QMB S66839) was collected on Anzac Day 2001.

Flavarchaea badja, sp. nov.

(Figs 44–47, 60, 65)

Material examined

Holotype. ♂, Australia, New South Wales, Badja State Forest, Burkes Road, 36°10′33″S, 149°31′58″E, 13.iii.1999, J. Tamawski, S. Lassau (AMS KS59219).

Paratypes. **New South Wales:** allotype ♀, same data as holotype (AMS KS91430); 1♀, same data except Badja Fire Trail, 36°06′46″S, 149°32′38″E (AMS KS91431); 2♂, 3 km north of Batemans Bay, wet sclerophyll, 35°41′S, 150°11′E, 9.vi–30.viii.1982, S. Peck, J. Peck (AMNH).

Diagnosis

Distinguished from other congeners by the following combination of characters: male dorsal scute large, broadly fused to anterior sclerite (Fig. 47); paracymbium with lower flange and paracymbial spur (Fig. 46); spur on paracymbium situated medially between tip of lower flange and distal tip of paracymbium (Fig. 46); female receptacula with prominent indentation opposite each ‘nose-like’ inner lobe (Fig. 60)

Description

Male (*holotype*). Body size: medium-sized. Total length 1.53. Carapace 0.67 long, 0.47 wide. Abdomen 0.86 long, 0.70 wide. Colour: carapace mustard-yellow. Abdomen beige-yellow, with mustard-yellow dorsal scute. Legs pale

mustard-yellow. Carapace: dorsal surface of pars cephalica relatively flat, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges present on outer surface. Dentition: PTA 5, PTB 3, PTC 3 (11). Abdomen: post-epigastric sclerites fused to anterior sclerite. Large, rectangular dorsal scute, broadly fused to anterior sclerite and extending posteriorly to half length of DSQ from DSP2 (Fig. 47). Spinnerets encircled by sclerotised cuticle, extending ventrally up to length of VSQ from latter. Pedipalp (AMNH; Figs 44–46): paracymbium distally cup-shaped, with pronounced lower flange; small spur situated medially between tip of lower flange and distal tip of paracymbium. Distal cup-shaped region of paracymbium with short rounded inner process and pronged, spur-like dorsal and ventral outer processes; without pointed ventral process. Distal plate with distal conductor, large mound-like retromedian apophysis, and distally-pointed, triangular prodistal apophysis with large proximal spur. Embolus with leaf-like process distally. Legs: femur I with dorsally-curved row of five retrolateral denticles.

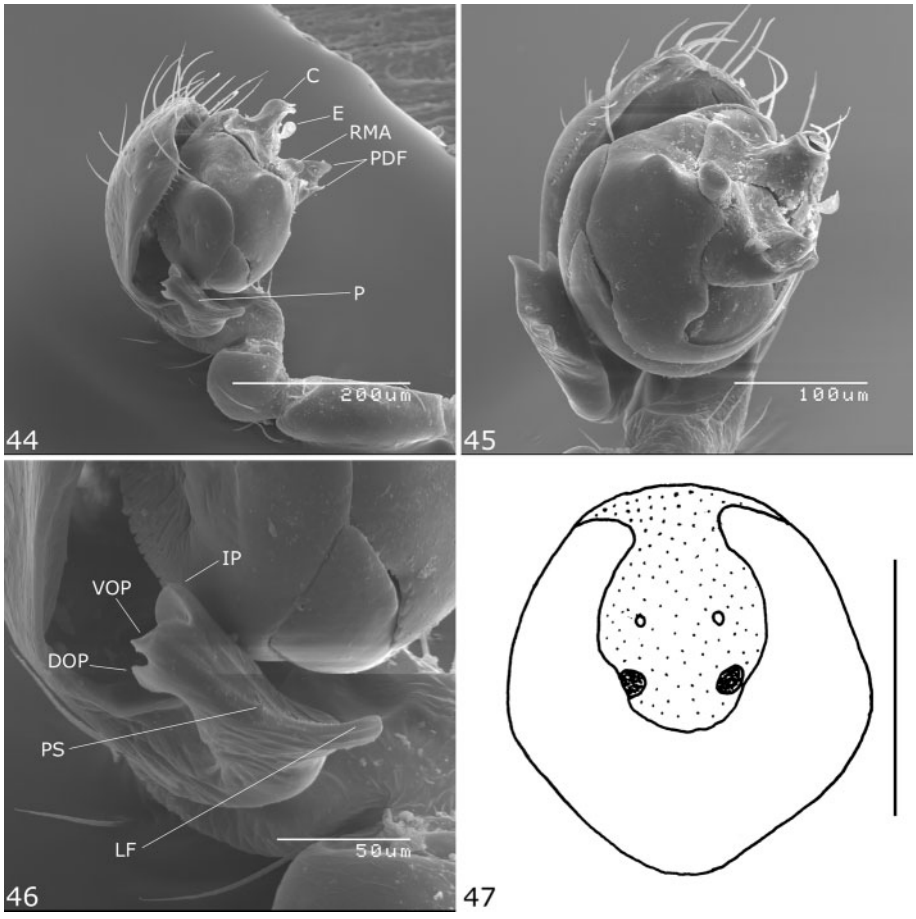
Female (*allotype*). Body size: medium-sized. Total length 1.75. Carapace 0.78 long, 0.49 wide. Abdomen 0.97 long, 0.75 wide. Colour: carapace mustard-yellow. Abdomen beige-yellow. Legs pale mustard-yellow. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 5, PTB 3, PTC 3 (11). Abdomen: spinnerets surrounded by sclerotised cuticle dorsally and ventrally; cuticle medially constricted ventrally. Tracheal sclerite present. Epigyne (AMS KS91431; Fig. 60): receptacula indented laterally, with prominent ‘nose-like’ inner lobes. Legs: femur I with dorsally-curved row of five retrolateral denticles.

Distribution and habitat

Known only from south-east of the Australian Capital Territory, from Batemans Bay south to Badja, New South Wales (Fig. 65).

Etymology

The specific epithet is a noun in apposition, taken from the type locality.



Figs 44–47. *Flavarchaea badja*. *44–46*, Scanning electron micrographs of male right pedipalp: *44*, retrolateral view; *45*, retroventral view; *46*, detail of paracymbium, retrolateral view. *47*, Male abdomen and dorsal scute, anterodorsal view. Unmarked scale bar = 0.5 mm.

Flavarchaea barmah, sp. nov.

(Figs 48–51, 62, 65)

Material examined

Holotype. ♂, Australia, Victoria, Barmah Forest, pitfall trap on forest floor, 36°01′S, 144°58′E, 7.viii.2000, A. Ballinger (WAM T63285).

Paratypes. **Victoria:** allotype ♀, same data as holotype (WAM T63286); 1♂, Melbourne, Warrandyte, litter from thicket, 37°44′S, 145°13′E, 12.vii.1980, R. Raven (QMB S57270). **New South Wales:** 1♂, Smiths Lake, UNSW Biology Station, yellow pans, marsh/heath, 32°23′S, 152°30′E, 25–28.ix.2000, D. Bickel (AMS KS75570).

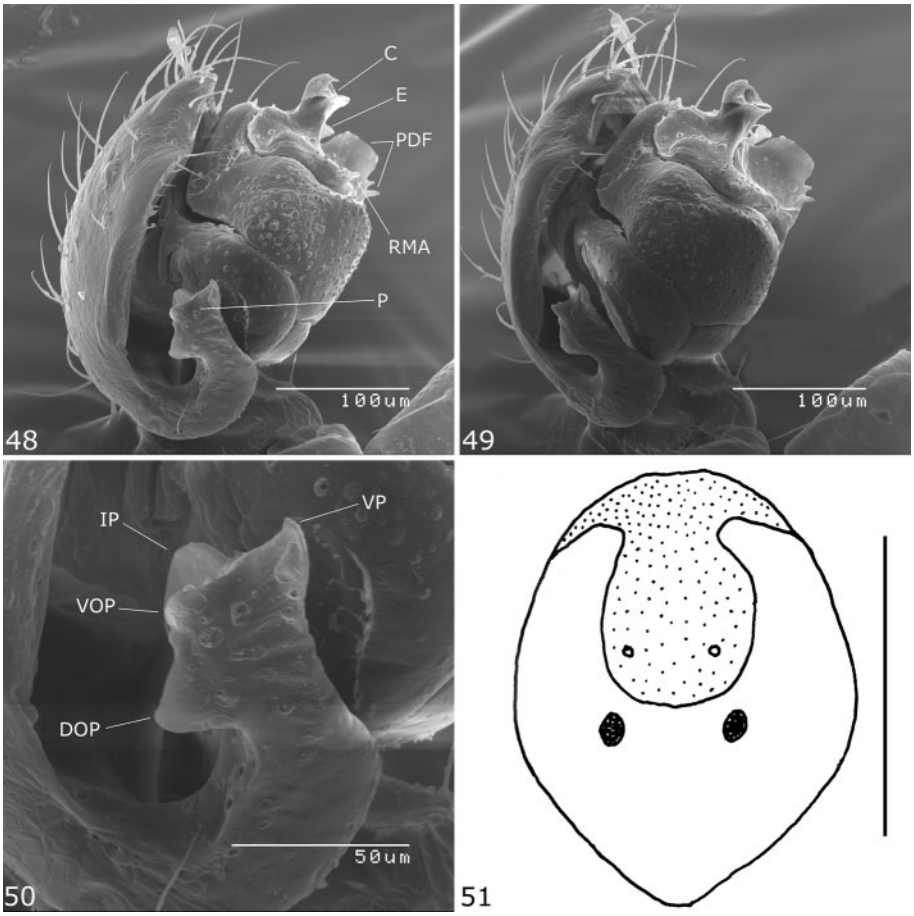
Diagnosis

Distinguished from other congeners by the small male dorsal scute, which is broadly fused to the anterior sclerite (Fig. 51).

Description

Male (*holotype*). Body size: medium-sized. Total length 1.40. Carapace 0.63 long, 0.42 wide. Abdomen 0.77 long, 0.56 wide. Colour: carapace mustard-yellow; pars thoracica darkest. Abdomen mustard-yellow, with darker marbled patterning. Legs pale mustard-yellow. Carapace: dorsal surface of pars cephalica weakly convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges present on outer surface. Dentition: PTA 5, PTB 2, PTC 3 (10). Abdomen: post-epigastric sclerites separate from anterior sclerite. Small, oval dorsal scute, broadly fused to anterior sclerite and extending posteriorly to three-quarters length of DSQ from DSP1 (Fig. 51). Spinnerets encircled by sclerotised cuticle, extending ventrally up to length of VSQ from latter. Pedipalp (AMS KS75570; Figs 48–50): paracymbium distally cup-shaped, with short rounded inner process, pronged, spur-like dorsal and ventral outer processes, and pointed ventral process. Distal plate with distal conductor, small spur-like retromedian apophysis, and rounded-rectangular prodistal apophysis with two proximal spurs. Embolus with leaf-like process distally. Legs: femur I with dorsally-curved row of five retrolateral denticles.

Female (*allotype*). Body size: medium-sized. Total length 1.81. Carapace 0.70 long, 0.45 wide. Abdomen 1.11 long, 0.72 wide. Colour: carapace mustard-yellow. Abdomen



Figs 48–51. *Flavarchaea barmah*. *48–50*, Scanning electron micrographs of male right pedipalp: *48*, retrolateral view; *49*, retroventral view; *50*, detail of paracymbium, retrolateral view. *51*, Male abdomen and dorsal scute, anterodorsal view. Unmarked scale bar = 0.5 mm.

pale mustard-yellow. Legs mustard-yellow. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 5, PTB 3, PTC 3 (11). Abdomen: spinnerets surrounded by sclerotised cuticle dorsally and ventrally; cuticle medially constricted ventrally. Tracheal sclerite present. Epigyne (Fig. 62): receptacula rounded, with 'nose-like' inner lobes. Legs: femur I with dorsally-curved row of five retrolateral denticles.

Distribution and habitat

Known from south-eastern Australia, from Smiths Lake, north of Newcastle, south to Melbourne, Victoria (Fig. 65).

Etymology

The specific epithet is a noun in apposition, taken from the type locality.

Flavarchaea hickmani (Rix), comb. nov.

(Figs 5, 63, 66)

Pararchaea hickmani Rix, 2005: 141, figs 3, 13–17.

Material examined

Holotype. ♂, Australia, Tasmania, Strathgordon, sifted from moss in forested valley overlooking inbound highway, 42°46′S, 146°03′E, 17.i.2002, M. Rix (AMS KS82657).

Paratypes. **Tasmania:** allotype ♀, West Downs via Ridgely, end of Basils Road, litter, 42°20′S, 145°39′E, 1.xii.1978, D. DeLittle (AMS KS82658).

Other material examined. **Tasmania:** 1♀, 1♂, Waterhouse Point, 40°50′51″S, 147°38′07″E, xi.1986, T. Churchill (QVM 13: 46); 1♀, same data (QMB S16727); 1♀, same data except ix.1987 (QVM 13: 3244); 1♀, same data (QVM 13: 3212); 1♂, 1♀, Mount Barrow, moss, 41°23′S, 147°25′E, 8.vii.1952, V. V. Hickman (AMS KS54299); 2♂, Punchbowl Reserve, Launceston, moss, 41°25′S, 146°07′E, 25.v.1950, V. V. Hickman (AMS KS28719); 2♂, McPartlan Pass, pitfall, 42°51′S, 146°11′E, 5.iii.1999, M. Driessen (QMB S60758); 1♂, same data except 14.ix.1999 (QMB S60760); 1♂, same data (QMB S60761); 1♂, Gordon River Road near Maydena, sifted from moss near lookout, 42°43′35″S, 146°27′06″E, 16.i.2002, M. Rix (QMB S60759).

Diagnosis

Distinguished from other congeners by the small, circular male dorsal scute, which is separate from the anterior sclerite (Fig. 5).

Distribution and habitat

Widespread in Tasmania (Fig. 66), where it has been collected from moss. This species is known from coastal and subalpine heathland habitats, and is common in some regions.

Flavarchaea lofty**,** sp. nov.

(Figs 38–39, 52–55, 64, 66)

Material examined

Holotype. ♂, Australia, South Australia, Mt Lofty Ranges, Mark Oliphant Conservation Park, in leaf litter with moss, 35°01′S, 138°42′E, 14.ix.1989, D. Hirst (SAM NN22262).

Paratypes. **South Australia:** allotype ♀, same data as holotype except in litter, no moss (SAM NN22263); 1♀, Tukumbini, Hope Forest, ex moss and few prostrate herbs under *Eucalyptus baxteri*, 35°16′S, 138°37′E, 14.ix.1980, R. V. Southcott (SAM NN22266).

Diagnosis

Distinguished from other congeners by the small, rectangular male dorsal scute, which is separate from the anterior sclerite (Fig. 55).

Description

Male (*holotype*). Body size: medium-sized. Total length 1.30. Carapace 0.61 long, 0.41 wide. Abdomen 0.69 long, 0.53 wide. Colour: carapace mustard-yellow. Abdomen beige-yellow, with mustard-yellow dorsal scute. Legs pale mustard-yellow. Carapace: dorsal surface of pars cephalica slightly convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges present on outer surface. Dentition: PTA 5, PTB 2, PTC 3 (10). Abdomen: post-epigastric sclerites separate from anterior sclerite. Small, rectangular dorsal scute, between DS1 and DS2 (Fig. 55). Spinnerets encircled by sclerotised cuticle, extending ventrally up to length of VSQ from latter. Pedipalp (Figs 38–39, 52–54): paracymbium distally cup-shaped, with short rounded inner process, pronged, spur-like dorsal and ventral outer processes, and pointed ventral process. Distal plate with distal conductor, small spur-like retromedian apophysis, and rounded-triangular prodistal apophysis with broad proximal spur. Embolus with leaf-like process distally. Legs: femur I with dorsally-curved row of five retrolateral denticles.

Female (*allotype*). Body size: medium-sized. Total length 1.98. Carapace 0.67 long, 0.44 wide. Abdomen 1.31 long, 0.92 wide. Colour: carapace brown. Abdomen beige-yellow. Legs mustard-yellow. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 5, PTB 2, PTC 3 (10). Abdomen: spinnerets surrounded by sclerotised cuticle dorsally and ventrally; cuticle medially constricted ventrally. Tracheal sclerite present. Epigyne (SAM NN22266; Fig. 64): receptacula rounded, with anteriorly-directed 'nose-like' inner lobes just touching medially. Legs: femur I with dorsally-curved row of five retrolateral denticles.

Distribution and habitat

Known only from the Mount Lofty Ranges, east of Adelaide, South Australia (Fig. 66).

Etymology

The specific epithet is a noun in apposition, taken from the type locality.

Flavarchaea lulu (Rix), comb. nov.

(Figs 4, 61, 66)

Pararchaea lulu Rix, 2005: 143, figs 4, 18–23.

Material examined

Holotype. ♂, Australia, Tasmania, Warra Forest near Geeveston, ex log decay, 43°04′S, 146°43′E, 14.iv.2000, D. Bashford (QVM 13: 39992).

Paratypes. **Tasmania:** allotype ♀, same data as holotype (QVM 13: 39993).

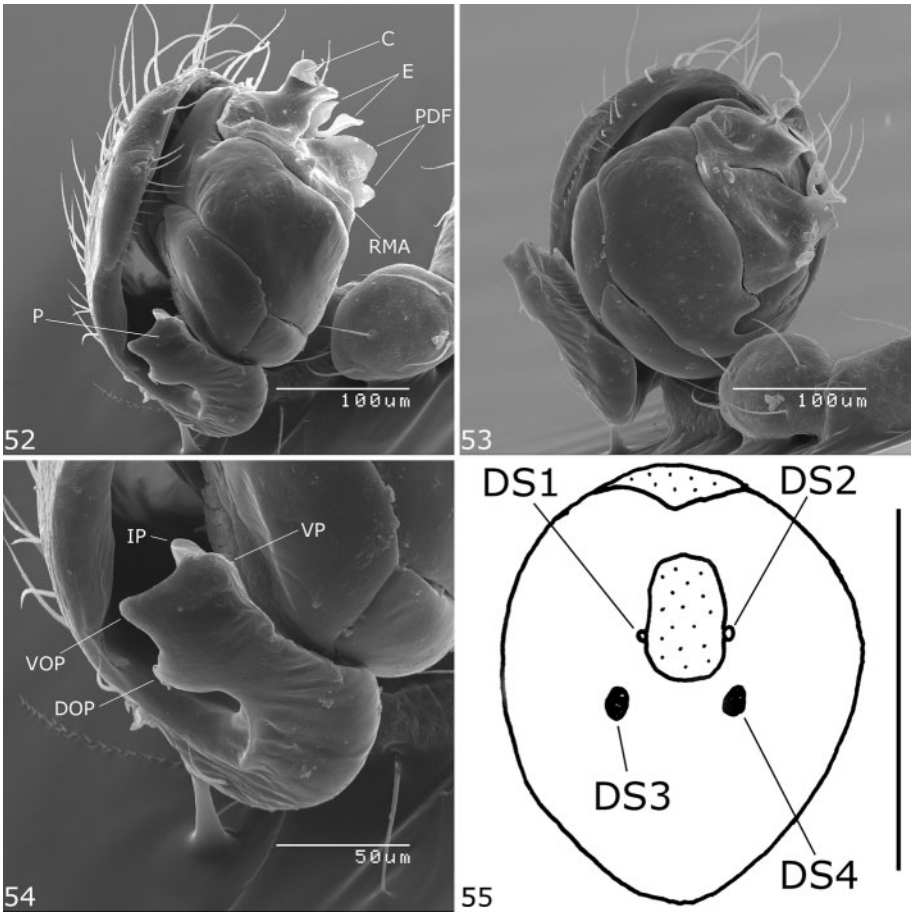
Other material examined. **Tasmania:** 1♂, same data as holotype except ex bark, 18.viii.1999 (QVM 13: 39994); 1♂, same data except ex malaise trap, 25.vii.2000 (QVM 13: 39995); 1♀, Pump House Point, Lake St Clair, 42°06′S, 146°12′E, 27.xii.1994, T. Kingston *et al*. (QVM 13:23690); 1♀, 1♂, Mt Field National Park, Lake Dobson Road, sifting moss, 42°40′59″S, 146°38′55″E, 15.i.2002, M. Rix (QMB S60757); 2♀, Arve Forest, in moss, 43°11′05″S, 146°47′E, 1.xii.1955, V. V. Hickman (AMS KS28716); 1♀, Tarraleah, 42°18′S, 146°26′E, i.1954, V. V. Hickman (AMS KS28724); 1♀, same data except 7.x.1957 (AMS KS28725); 1♀, Frodshams Pass, pitfall, 42°49′S, 146°13′E, 24.ii.1990, G. Cassis (AMS KS62695); 1♀, Mount Wellington, from moss, 42°54′S, 147°14′E, 28.xi.1955, V. V. Hickman (AMS KS28722); 1♂, 1♀, same data except 14.vi.1944 (AMS KS54298); 1♀, Fingal, in moss, 41°38′S, 147°58′E, 24.v.1928, V. V. Hickman (AMS KS28717); 1♀, Trevallyn, 41°27′S, 147°10′E, 26.vi.1931, V. V. Hickman (AMS KS54296); 1♀, Fish River track to Walls of Jerusalem, in moss, 41°46′S, 146°16′E, 11.i.1981, J. L. Hickman (AMS KS54301); 1♂, south-western Tasmania, 42°56′S, 145°50′E, 19.ii.1977, C. Howard *et al*. (AMS KS26475); 1♀, Strathgordon, moss, 42°46′S, 146°03′E, 24.iv.1978, J. L. Hickman (AMS KS28726).

Diagnosis

Distinguished from other congeners by the following combination of characters: male dorsal scute large, separate from or only just fused to anterior sclerite (see Rix 2005, fig. 22); paracymbium without lower flange (see Rix 2005, fig. 21).

Distribution and habitat

Widespread in Tasmania (Fig. 66), where it has been collected from moss and rotting logs.



Figs 52–55. *Flavarchaea lofty*. *52–54*, Scanning electron micrographs of male right pedipalp: *52*, retrolateral view; *53*, retroventral view; *54*, detail of paracymbium, retrolateral view. *55*, Male abdomen and dorsal scute, anterodorsal view. Unmarked scale bar = 0.5 mm.

Flavarchaea stirlingensis, sp. nov.

(Figs 58, 66)

Material examined

Holotype. ♀, Australia, Western Australia, Stirling Range National Park, north-west of Two Mile Lake, pitfall trap, 34°28′S, 118°15′E, 10–20.ix.1990, G. Friend *et al*. (WAM T46268).

Diagnosis

Distinguished from other congeners by the shape of the receptacula, which are oriented anterodorsally (Fig. 58).

Description

Female (*holotype*). Body size: small. Total length 1.59. Carapace 0.62 long, 0.42 wide. Abdomen 0.97 long, 0.64 wide. Colour: carapace mustard-yellow. Abdomen cream. Legs pale mustard-yellow. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 5, PTB 2, PTC 3 (10). Abdomen: spinnerets not surrounded by sclerotised cuticle. Tracheal sclerite present. Epigyne (Fig. 58): oriented anterodorsally, with prominent ‘nose-like’ inner lobes. Legs: femur I with dorsally-curved row of five retrolateral denticles.

Distribution and habitat

Known only from the Stirling Range National Park in south-western Western Australia (Fig. 66).

Etymology

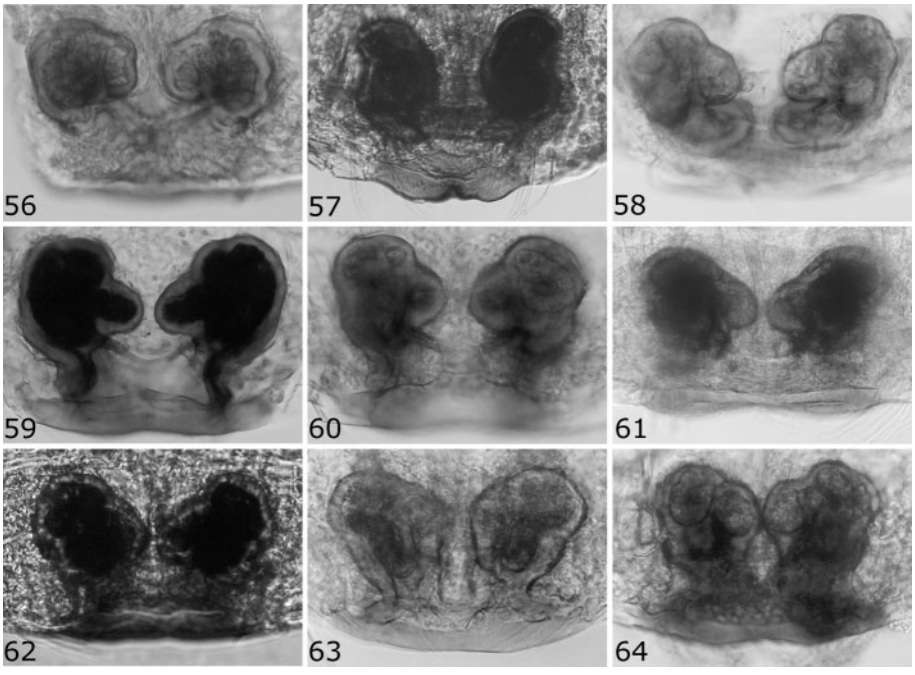
The specific epithet is a noun in apposition, taken from the type locality.

Flavarchaea spp.

In the absence of males, the following female specimens could not be confidently described or accurately diagnosed as existing species.

Material examined

Queensland: 1♀, Blackdown Tableland National Park, North Mimosa Creek, sieved litter in open forest, 24°30′S, 149°49′E, 8.vii.1991, D. Black (WAM T46260); 1♀, Atherton Tableland, Baldy Mountain, rainforest sieved litter, 17°17′S, 145°27′E, 10.x.1980, G. Monteith (QMB S57273). **New South Wales**: 1♀, Sirius Road, Oakes State Forest, pitfall traps, 30°29′19″S, 152°35′27″E, 11–24.xi.1999, M. Gray, G. Milledge, H. Smith (AMS KS61667); 1♀, Bulls Ground State Forest, litter, 31°35′S, 152°41′E, x.1999, A. York (AMS KS89715). **Victoria**: 1♀, Belgrave, 37°54′S, 145°21′E, i.1944, C. Oke (AMS KS28714); 1♀, 2 km east-north-east of Mount Margaret, The Beeches, *Nothofagus cunninghamii* litter, 37°28′S, 145°49′E, 30.ix.1986, M. S. Harvey (WAM T46263); 1♀, Mount Donna Buang, window trap in *Eucalyptus*/*Nothofagus* forest, 37°43′S, 145°40′E, 11–17.i.1980, A. Newton, M. Thayer (AMNH). **South Australia**: 1♀, Wine Shanty Track, Cleland Conservation Park, Mount Lofty Ranges, pitfall, 34°57′S, 138°42′E, 28.xi–5.xii.1994, E. G. Matthews, J. A. Forrest (SAM NN22265); 1♀, same data except Waterfall Gully, ex moss and leaf litter, 24.v.1968, D. C. Lee (SAM NN22264).



Figs 56–64. Female epigynes of species of *Pararchaea*, *Forstrarchaea* and *Flavarchaea*. *56–64*, Receptacula, dorsal view: *56, Pararchaea alba*; *57*, *Forstrarchaea rubra*; *58, Flavarchaea stirlingensis*; *59*, *Flavarchaea anzac*; *60*, *Flavarchaea badja*; *61*, *Flavarchaea lulu*; *62*, *Flavarchaea barmah*; *63*, *Flavarchaea hickmani*; *64*, *Flavarchaea lofty*.

Genus ***Forstrarchaea***, gen. nov.

Type species: *Zearchaea rubra* Forster, 1949.

Diagnosis

The genus *Forstrarchaea*, represented only by *F. rubra*, can be distinguished from all other Pararchaeidae except *Nanarchaea* by the absence of proximal retrolateral denticles on femur I, and from *Nanarchaea* by the absence of a dorsal scute on the male abdomen (Fig. 16). Further distinguished from other pararchaeid genera by the unique colour pattern on the dorsal abdomen (Fig. 16).

Description

A monotypic genus of large (Fig. 17), patterned Pararchaeidae, known only from the North Island of New Zealand.

Cephalothorax. Carapace, when viewed laterally, rhomboidal. Eight eyes in two rows; laterals pearly-white, contiguous; AME separated, dark-coloured; PME pearly-white, well separated from each other and from AME.

Chelicerae. Promargin adjacent to fang with two groups (PTA + PTB, PTC) of stout peg teeth; PTA + PTB with eight contiguous teeth adjacent to non-extended fang; PTC with three larger teeth on promargin of outer surface. Outer surface of paturon of males without transverse stridulatory ridges.

Legs. Femur I without proximal retrolateral denticles.

Abdomen. Abdomen, when viewed dorsally, elongate-oval, without tubercles. Dorsal scute absent on males. Post-epigastric sclerites present on males and females; small and square or triangular on females, enlarged and extensive on males. Six spinnerets, fully developed; encircled by sclerotised cuticle. Posterior tracheal spiracle situated closely anterior to colulus, surrounded by extended spinneret sclerite, or by separate tracheal sclerite on females.

Male genitalia. Male palpal patella and tibia without processes. Cymbium spoon-shaped with prominent retrolateral apophysis (paracymbium) proximally. Paracymbium twisted, with short, rounded-rectangular inner process, spur-like dorsal outer process and flattened, triangular ventral outer process with hooked tip (see Forster and Platnick 1984, figs 237–238). Bulb large, extending over full length of cymbium; embolus spinous, arising from base and curving around prolateral margin of bulb. Sclerotised distal plate situated over bulb, distal to base of embolus. Distal plate with prominent, hooked distal apophysis forming conductor, large prodistal flange, prolateral sheath around embolus and small retrodistal apophysis (see Forster and Platnick 1984, figs 237–238). Mound-like cuticular sculpture present on distal plate, extending from near base of embolus to near tip of prodistal flange.

Female genitalia. Epigyne with pair of separate, thick-walled, kidney-shaped receptacula (Fig. 57), composed of internal systems of ducts and chambers; a single distinct fertilisation duct leads from each receptaculum into bursal cavity.

Distribution

Forstrarchaea rubra is known from New Zealand, where it has been found throughout the northern half of the North Island (Fig. 67).

Etymology

The generic name is derived from ‘Forster’, and refers to the late Raymond R. Forster (1922–2000), for his enormous contribution to the study of Australasian spiders. The gender is considered feminine.

Included species

Forstrarchaea rubra (Forster, 1949).

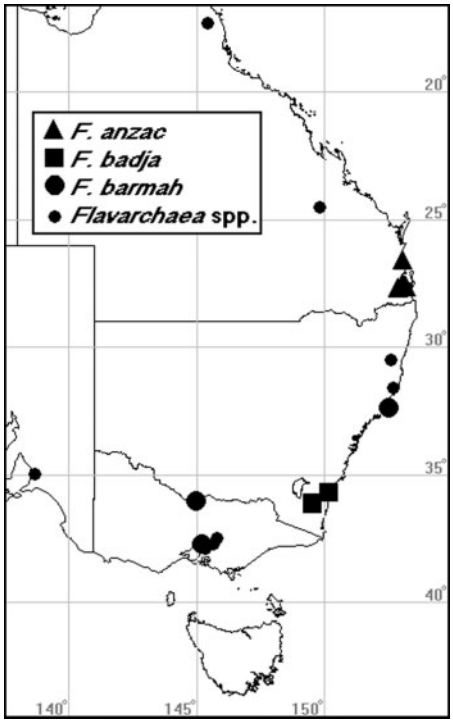


Fig. 65. Collection localities for species of *Flavarchaea* in south-eastern Australia. Note the distribution of undescribed female specimens.

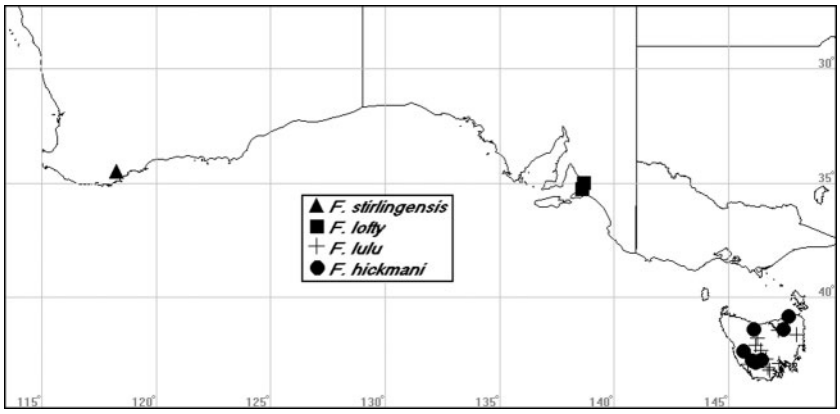


Fig. 66. Collection localities for species of *Flavarchaea* in southern and south-western Australia.

Forstrarchaea rubra (Forster), comb. nov.

(Figs 16, 57, 67)

Zearchaea rubra Forster, 1949: 197, figs 9–15.
Pararchaea rubra Forster, 1955: 402. – Forster & Platnick, 1984: 71, figs 212, 213, 221–229, 235–238; Rix, 2005: 138.

Material examined

New Zealand: 1♂, Lake Waikaremoana, Hawkes Bay, litter, 38°46′S, 177°05′E, 17.i.1972, G. W. Ramsay (OMD); 1♀, same data except Papaotehiwera Bay, sifting litter/moss, 19–26.xi.1996, L. J. Boutin (QVM 13: 45027); 1♂, Rotorua, Lake Okataina, litter, 38°07′S, 176°25′E, 10.iv.1965, N. A. Walker (OMD); 1♂, Huiarau Range, litter, 38°45′S, 177°00′E, 17.i.1972, G. Ramsay (OMD); 1♀, Hawkes Bay, south of Arowhana Station, litter, 38°07′S, 177°52′E, 28.ii.1971, A. C. Eyles (OMD); 1♀, Lake Waikare Iti, 38°42′S, 177°11′E, xii.1949 (OMD); 1♀, Auckland, Mount Maungapohatu, litter, 38°35′S, 177°07′E, 3.iii.1971, J. I. Townsend (OMD).

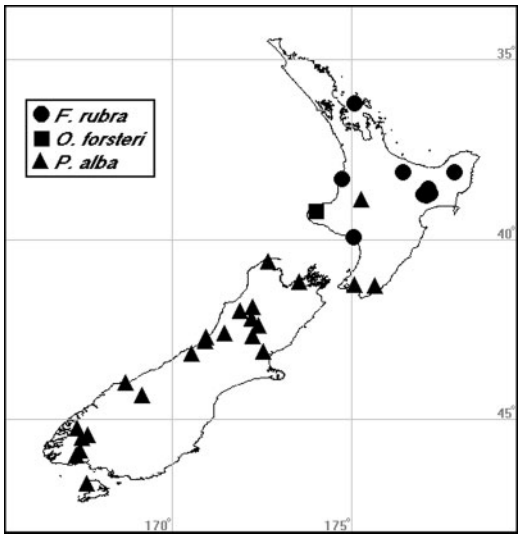


Fig. 67. Collection localities for *Forstrarchaea rubra*, *Ozarchaea forsteri* and *Pararchaea alba* in New Zealand.

Diagnosis

As for genus.

Distribution and habitat

As for genus.

Genus ***Nanarchaea***, gen. nov.

Type species: *Pararchaea binnaburra* Forster, 1955.

Diagnosis

Species of *Nanarchaea* can be distinguished from all other Pararchaeidae except *Forstrarchaea* by the absence of proximal retrolateral denticles on leg I, and from *Forstrarchaea* by the presence of a very large dorsal scute on the male abdomen (Fig. 6; see also Hickman 1969, fig. 25). Males further distinguished from other pararchaeid genera by the presence of a medial indentation on the dorsal surface of the pars cephalica (see Rix 2005, fig. 10), and the presence of a proximally swollen tarsus I (see Hickman 1969, fig. 27).

Description

Small Pararchaeidae (Fig. 17), beige, yellow or brown in colour, widely distributed in south-eastern Australia.

Cephalothorax. Carapace, when viewed laterally, rhomboidal. Pars cephalica of males with medial indentation (see Rix 2005, fig. 10). Eight eyes in two rows; laterals pearly-white, contiguous; AME separated, dark-coloured; PME pearly-white, well separated from each other and from AME.

Chelicerae. Promargin adjacent to fang with three groups (PTA, PTB, PTC) of stout peg teeth; PTA with five contiguous teeth directly adjacent to non-extended fang; PTC with three larger teeth on promargin of outer surface; PTB with one tooth between PTA and PTC. Outer surface of paturon of males with transverse stridulatory ridges (see Hickman 1969, fig. 26).

Legs. Femur I without proximal retrolateral denticles.

Abdomen. Abdomen, when viewed dorsally, broadly-oval or elongate-oval, without tubercles. Very large dorsal scute on males, fused to anterior sclerite and covering most of dorsal surface of abdomen (Fig. 6). Post-epigastric sclerites present on males and females; small and square or triangular on females, enlarged on males. Six spinnerets, fully developed; encircled by sclerotised cuticle. Posterior tracheal spiracle situated closely anterior to colulus, surrounded by extended spinneret sclerite.

Male genitalia. Male palpal patella and tibia without processes. Cymbium spoon-shaped with prominent retrolateral apophysis (paracymbium) proximally. Paracymbium 'spanner-shaped', with long, distally rounded inner process and outer process (Fig. 70). Bulb large, extending over full length of cymbium; embolus spinous, arising from base and curving around prolateral margin of bulb. Sclerotised distal plate situated over bulb, distal to base of embolus. Distal plate with distal apophysis forming conductor, large, divided prodistal flange, and prolateral sheath around embolus. Mound-like, spur-like and spine-like cuticular sculpture present on distal plate (Fig. 71).

Female genitalia. Epigyne with pair of separate, thick-walled, 'comma-shaped' receptacula (Figs 26–27), composed of internal systems of ducts and chambers; a single distinct fertilisation duct leads from each receptaculum into bursal cavity.

Distribution

Species of *Nanarchaea* are known from south-eastern Australia, from south-eastern Queensland to Tasmania.

Etymology

The generic name is derived from the Latin adjective 'nanus', meaning dwarf, and refers to the small body size of species in this genus. The gender is considered feminine.

Included species

Nanarchaea binnaburra (Forster, 1955), *N. bryophila* (Hickman, 1969).

Nanarchaea binnaburra (Forster), comb. nov.

(Fig. 26, 72)

Pararchaea binnaburra Forster, 1955: 401, figs 6, 7, 9 (figs 8, 13–15: ♀ *Anarchaea raveni*, misidentified as conspecific with holotype ♀ *P. binnaburra*). – Forster & Platnick, 1984: 71; Rix, 2005: 138.

Material examined

Holotype. ♀, Australia, Queensland, Lamington Plateau, Binna Burra, ex. leaf mould, 28°11′S, 153°10′E, 7.ix.1952, T. E. Woodward (QMB S66833).

Paratypes. **Queensland:** ♀ *Anarchaea raveni*, same locality data as holotype, misidentified as conspecific with holotype ♀ *P. binnaburra* (QMB S66829).

Other material examined. **Queensland:** 1♂, 8♀, same data as holotype except 27.iii–3.iv.1976, R. Raven, V. Davies (QMB S57271).

Diagnosis

Tentatively distinguished from *N. bryophila* by the shape of the female receptacula, with the nose-like inner lobes just touching medially (Fig. 26).

Description

Male. In very poor condition, inadvertently bleached transparent by former preservation error. Body size: small. Total length 1.27. Carapace 0.55 long, 0.38 wide. Abdomen 0.72 long, 0.55 wide. Colour: body bleached pale yellow. Carapace: dorsal surface of pars cephalica flat, sloping down to AME from posterior margin, with indentation medially. Chelicerae: no discernible stridulatory ridges on outer surface. Dentition: PTA 5(?), PTB 1, PTC 3 (9). Abdomen: post-epigastric sclerites fused to anterior sclerite. Very large, broad dorsal scute, fused to anterior sclerite and extending posteriorly along three-quarters length of abdomen. Spinnerets encircled by sclerotised cuticle, extending ventrally up to length of VSQ from latter. Pedipalp (QMB S57271): damaged. Paracymbium bifurcate, with inner and outer processes; short spur present at base of outer process. Distal plate with large distal conductor, and large divided prodistal flange. Cuticular sculpture of distal plate: mound-like lumps near base of embolus, with spur-like projections extending along ridges on conductor and prodistal flange. Several spine-like projections at base of prodistal flange. Legs: femur I without retrolateral denticles.

Female. Epigyne (QMB S57271; Fig. 26): receptacula 'comma-shaped', with prominent 'nose-like' inner lobes just touching medially.

Distribution and habitat

Known only from the Lamington Plateau, south-eastern Queensland. Specimens have been found in moss and leaf litter.

Nanarchaea bryophila (Hickman), comb. nov.

(Figs 6, 27, 68–72)

Pararchaea bryophila Hickman, 1969: 9, figs 25–30. – Forster & Platnick, 1984: 71; Schütt, 2000: 137, figs 2, 6, 7, 10; Rix, 2005: 139, figs 7, 9–10.

Material examined

Holotype. ♂, Australia, Tasmania, Launceston, Punch Bowl Reserve, moss, 41°25′S, 147°07′E, 24.viii.1929, V. V. Hickman (AMS KS6633).

Paratypes. **Tasmania:** allotype ♀, same data as holotype (AMS KS6634).

Other material examined. **Tasmania:** 2♂, same data as holotype (AMS KS28721); 1♂, 2♀, same data except 4.vii.1930 (AMS KS54295); 1♂, 1♀, Launceston, in moss, 41°27′S, 147°10′E, 5.v.1928, V. V. Hickman (AMS KS54300); 1♀, Point Sorell, pitfall, 41°07′S, 146°

31″E, 29.iii.1995, T. Kingston *et al*. (QVM 13: 17998); 1♀, no locality data (QVM 13: 23869); 1♂, 1♀, north-eastern Tasmania, litter, 41°08′S, 147°40′E, 2.vii.1974, J. Madden *et al*. (AMS KS25985); 1♂, King River, litter, 42°03′S, 145°40′E, 14.xii.1978, L. Hill (AMS KS65966); 1♂, end of Basils Road, West Downs via Ridgely, litter, 42°20′S, 145°39′E, 1.xii.1978, D. DeLittle (AMS KS66072); 2♀, same data except 22.i.1979 (AMS KS66078); 1♀, Dip River Falls, litter, 41°02′S, 145°22′E, 9.ii.1973 (AMS KS66038); 1♀, ~3 km S of Waratah Junction on Murchison Hwy, 41°28′S, 145°38′E, 29.i.1979, J. Smith (AMS KS66088); 1♀, west side, Lake St Clair, litter under *Banksia* trees, 42°02′S, 146°07′E, 25–29.i.1980, A. Newton, M. Thayer (AMNH). **Victoria:** 1♂, 1♀, Werribee River, 11.5km north-north-west of Ballan, ex leaf litter, 37°30′S, 144°22′E, 13.ix.1982, M. S. Harvey (WAM T46264). **New South Wales:** 1♂, Hazelbrook, Railway Parade, pitfall traps, 33°43′55″S, 150°27′E, 3.x.1996, AMBS (AMS KS54293); 1♀, same data (AMS KS54291); 1♂, same data except Winbourne Road, 33°43′20″S, 150°27′35″E (AMS KS54294); 1♂, same data except Coates Park, 33°43′S, 150°26′45″E, 22.viii.1996 (AMS KS54292).

Diagnosis

Tentatively distinguished from *N. binnaburra* by the shape of the female receptacula, with the nose-like inner lobes well separated medially (Fig. 27).

Distribution and habitat

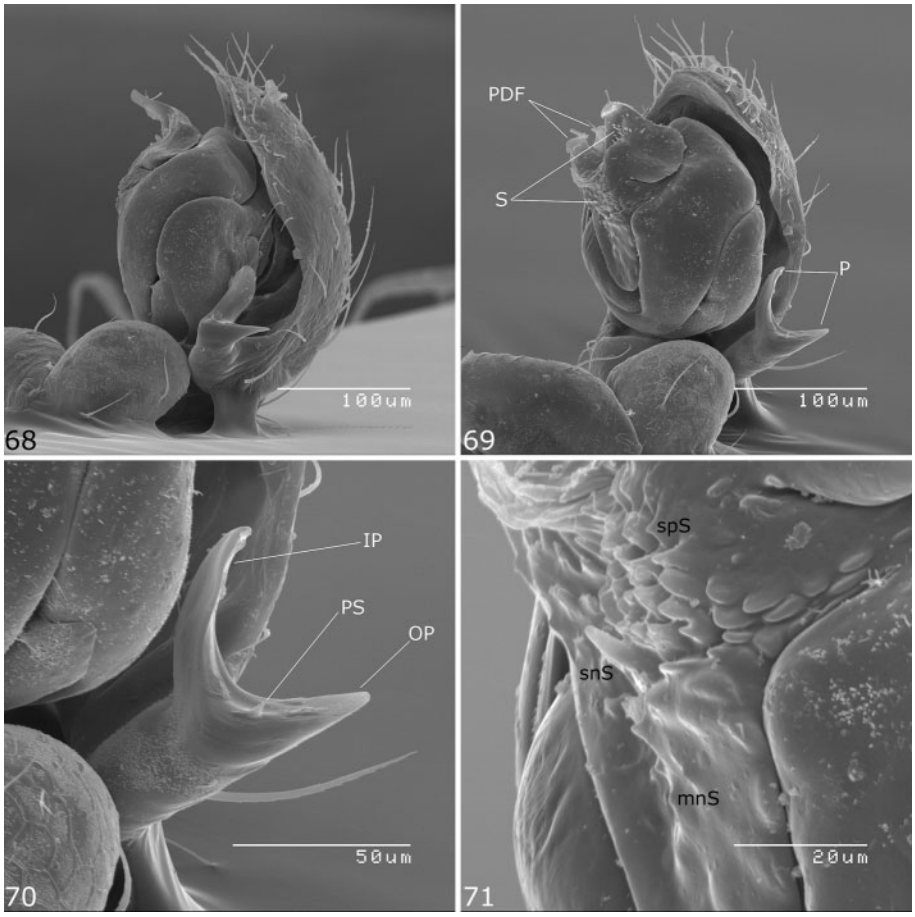
Widespread in south-eastern Australia, from the Blue Mountains, New South Wales, south to Tasmania (Fig. 72). In Tasmania, specimens have been collected from moss in bushland habitats.

Nanarchaea spp.

In the absence of males, the following female specimens could not be confidently described or accurately diagnosed as existing species.

Material examined

Queensland: 1♀, Girraween National Park, sieved litter in open forest, 28°51′S, 151°57′E, 28.vi.1991, D. Black (WAM T46259). **New South Wales**: Ku-ring-gai Chase National Park, Grosvenor Track, gully forest litter, 33°39′S, 151°13′E, 20.i.1999, M. R. Gray (AMS KS90139); 1♀, Macquarie University, Sydney, sieved litter, 33°45′S, 151°06′E, 22.vi.1991, D. Black (WAM T46258); 1♀, New England National Park, *Nothofagus* litter, 30°30′S, 152°30′E, 26.viii.1982, S. Peck, J. Peck (AMNH); 1♀, Royal National Park, frass under bark in gorge rainforest, 34°07′S, 151°02′E, 5–14.iv.1978, S. Peck, J. Peck (AMNH); 4♀,



Figs 68–71. Scanning electron micrographs of male left pedipalp of *Nanarchaea bryophila*: *68*, retrolateral view; *69*, retroventral view; *70*, detail of paracymbium, retroventral view; *71*, detail of cuticular sculpture, retroventral view.

Berowra, deep litter, 33°38′S, 151°09′E, R. R. Forster Collection (QM). **Victoria**: 1♀, Mount Buffalo National Park, walking track to Eurobin Falls, sieved litter in eucalypt forest, 36°43′S, 146°50′E, 8.v.1990, D. Black (WAM T46261); 1♀, Summers Hut, Limestone Creek, grass tussocks, 36°51′S, 148°03′E, 11.iv.1966, E. Hamilton-Smith (SAM NN22267); 1♀, Rotamah Island, The Lakes National Park, sieved *Banksia* litter, 37°58′S, 147°41′E, 11.vi.1990, D. Black (WAM T46262).

Genus ***Ozarchaea***, gen. nov.

Type species: *Pararchaea ornata* Hickman, 1969.

Diagnosis

Species of *Ozarchaea* can be distinguished from all other Pararchaeidae by the presence of a small to medium-sized (rarely absent) dorsal scute on the male abdomen (never extending posterior to level of DSP2; see Figs 12, 14), and an unmodified embolus or retrolateral cymbial edge on the male pedipalp. Males further distinguished from other pararchaeid genera by the presence of parallel ridges on the upper surface of the ventral outer process of the paracymbium (Figs 75, 79, 97, 101).

Description

Small to large Pararchaeidae (Fig. 17), variable in colour, widely distributed in Australia with a single species in New Zealand.

Cephalothorax. Carapace, when viewed laterally, rhomboidal. Eight eyes in two rows; laterals pearly-white, contiguous; AME separated, dark-coloured; PME pearly-white, well separated from each other and from AME.

Chelicerae. Promargin adjacent to fang with three groups (PTA, PTB, PTC) of stout peg teeth; PTA with 5–6 contiguous teeth directly adjacent to non-extended fang; PTC with three larger teeth on promargin of outer surface; PTB with 1–3 teeth between PTA and PTC. Outer surface of paturon of males with or without transverse stridulatory ridges.

Legs. Femur I with proximal, dorsally curved row of retrolateral denticles.

Abdomen. Abdomen, when viewed dorsally, broadly oval or elongate-oval, without tubercles. Small to medium-sized, usually circular or oval dorsal scute present (or rarely absent) on males; separate from or fused to anterior sclerite. Post-epigastric sclerites present on males and females; small and square or triangular on females, enlarged on males. Six spinnerets, fully developed; encircled by sclerotised cuticle, surrounded dorsally and ventrally by separate sclerites, or not surrounded by sclerotised cuticle. Posterior tracheal spiracle situated closely anterior to colulus, surrounded by extended spinneret sclerite, or by separate tracheal sclerite on females.

Male genitalia. Male palpal patella and tibia without processes. Cymbium spoon-shaped with prominent retrolateral apophysis (paracymbium) proximally, of variable (species-specific) shape. Paracymbium with long, twisted and distally pointed inner process, and dorsal and ventral outer processes; upper surface of ventral outer process with parallel rows of cuticular ridges (Figs 89–90). Bulb large, extending over full length of cymbium; embolus spinous, arising from base and curving around prolateral margin of bulb. Sclerotised distal plate situated over bulb, distal to base of embolus. Distal plate with distal apophysis forming conductor, large prodistal flange and prolateral sheath around embolus (Figs 89–90). Mound-like, spur-like or spine-like cuticular sculpture present on distal plate (Fig. 98).

Female genitalia. Epigyne with pair of separate, thick-walled, variously lobed receptacula (Figs 112–122), composed of internal systems of ducts and chambers; a single distinct fertilisation duct leads from each receptaculum into bursal cavity.

Distribution

Species of *Ozarchaea* are known from Australia, from north-eastern Queensland to Tasmania, and in south-western and central Western Australia. A single species (*O. forsteri*) is known from the North Island of New Zealand.

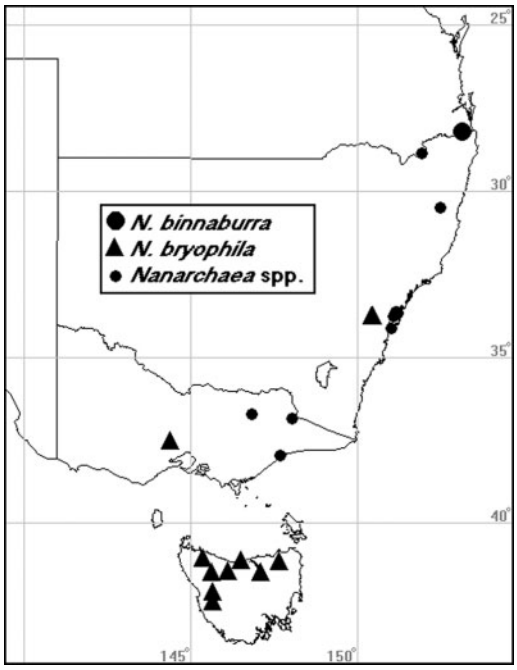


Fig. 72. Collection localities for species of *Nanarchaea* in south-eastern Australia. Note the distribution of undescribed female specimens.

Etymology

The generic name is derived from the colloquial term for Australia 'Oz', and refers to the large diversity of species in Australia. The gender is considered feminine.

Included species

Ozarchaea bodalla, sp. nov., *O. bondi*, sp. nov., *O. daviesae*, sp. nov., *O. forsteri*, sp. nov., *O. harveyi*, sp. nov., *O. janineae*, sp. nov., *O. ornata* (Hickman, 1969), *O. platnicki*, sp. nov., *O. saxicola* (Hickman, 1969), *O. spurgeon*, sp. nov., *O. stradbroke*, sp. nov., *O. valida*, sp. nov., *O. waldockae*, sp. nov., *O. werrikimbe*, sp. nov., *O. westraliensis*, sp. nov., *O. wiangarie*, sp. nov.

Key to species of *Ozarchaea*

*Females of *O. spurgeon*, sp. nov., *O. valida*, sp. nov., *O. waldockae*, sp. nov., *O. werrikimbe*, sp. nov. and *O. wiangarie*, sp. nov. are unknown; males of *O. bondi*, sp. nov., *O. bodalla*, sp. nov., *O. stradbroke*, sp. nov., *O. platnicki*, sp. nov. and *O. forsteri*, sp. nov. are unknown

**Females of *O. westraliensis*, sp. nov. and *O. janineae*, sp. nov. are indistinguishable except by distribution (see couplet 21)

1. Males 2
   Females 12
2. Paracymbium with flattened, 'wing-like' ventral outer process (Figs 75, 79, 83, 87, 90); *Ozarchaea ornata* species-group 3
   Paracymbium with pronged dorsal and ventral outer processes; ventral outer process never flattened and 'wing-like' (Figs 93, 97, 101, 105, 109) 7
3. Dorsal abdomen with brown anterior cardiac stripe and brown posterior chevrons (Figs 9–11) 4
   Dorsal abdomen uniformly coloured or with diffuse marbled colour pattern 6
4. Brown cardiac stripe on dorsal abdomen of uniform width or tapered posteriorly (Figs 9, 11) 5
   Brown cardiac stripe on dorsal abdomen distinctly widened posteriorly (Fig. 10); Western Australia . . . . *O. harveyi*, sp. nov.
5. Dorsal abdomen with five brown posterior chevrons (Fig. 11); Tasmania . . . . . *O. ornata* (Hickman)
   Dorsal abdomen with four brown posterior chevrons (Fig. 9); New South Wales . . . . . *O. werrikimbe*, sp. nov.
6. Dorsal abdomen with dorsal scute (Fig. 12). . . . . *O. valida*, sp. nov.
   Dorsal abdomen without dorsal scute (Fig. 111) . . . . . *O. wiangarie*, sp. nov.
7. Dorsal scute very small, transversely-elongate, between DS1 and DS2 (see Rix 2005, fig. 11); inner process of paracymbium not proximally widened along dorsal edge (Figs 93, 97); distal plate with less than four spine-like cuticular projections in small cluster (Figs 94, 98); adult body size large; *Ozarchaea daviesae* species-group 8
   Dorsal scute small, circular (Fig. 14); inner process of paracymbium proximally widened along dorsal edge (Figs 101, 105, 109); distal plate with extensive cluster of spine-like cuticular projections (Figs 102, 106, 110); adult body size small to medium-sized; *Ozarchaea westraliensis* species-group . . 10
8. Adult body size very large (carapace length greater than 0.9 mm); Tasmania . . . . . *O. saxicola* (Hickman)
   Adult body size large but not very large (carapace length less than 0.85 mm) 9
9. Femur I with four retrolateral denticles; Queensland . . . . . *O. daviesae*, sp. nov.
   Femur I with five retrolateral denticles; Western Australia . . . . . *O. waldockae*, sp. nov.
10. Distal plate with raised whorl of spine-like cuticular projections at distal end of cluster (Figs 102, 110) 11
    Distal plate with less than four spine-like cuticular projections at distal end of cluster (Fig. 106); north-eastern Queensland . . . . . *O. spurgeon*, sp. nov.
11. Ventral and dorsal outer processes of paracymbium spine-like, widely divergent (Fig. 109); Western Australia . . . . . *O. westraliensis*, sp. nov.
    Ventral and dorsal outer processes of paracymbium spur-like, directed retrolaterally (Fig. 101); New South Wales. . . . . *O. janineae*, sp. nov.
12. Dorsal abdomen with distinctive brown colour pattern against pale background (Figs 8, 13); *Ozarchaea ornata* species-group (part) 13
    Dorsal abdomen uniformly coloured, or with diffuse marbled colour pattern 16
13. Dorsal abdomen with brown median longitudinal stripe extending the length of the abdomen (Fig. 8); New Zealand . . . . . *O. forsteri*, sp. nov.
    Dorsal abdomen without brown median longitudinal stripe extending the length of the abdomen (Figs 11, 13). 14
14. Dorsal abdomen with brown posterior wedge-shaped marking (Fig. 13); north-eastern Queensland. . . *O. platnicki*, sp. nov.
    Dorsal abdomen with brown anterior cardiac stripe and brown posterior chevrons (Fig. 11) 15
15. Brown cardiac stripe on dorsal abdomen distinctly widened posteriorly (Fig. 10); Western Australia. . . . *O. harveyi*, sp. nov.
    Brown cardiac stripe on dorsal abdomen tapered posteriorly (Figs 9, 11); Tasmania . . . . . *O. ornata* (Hickman)
16. Receptacula 'flower-shaped' with prominent 'nose-like' inner lobes (Fig. 112); New South Wales; *Ozarchaea ornata* species-group (part) . . . . . *O. bodalla*, sp. nov.
    Receptacula otherwise 17
17. Receptacula broadly touching along inner margins (Figs 120–122); *Ozarchaea daviesae* species-group 18
    Receptacula not touching or only just touching along inner margins (Figs 117–119); *Ozarchaea westraliensis* species-group 20
18. Receptacula circular, 'comma-shaped' (Figs 120–121) 19
    Receptacula extensively lobed (Fig. 122) . . . . *O. bondi*, sp. nov.
19. Adult body size very large (carapace length greater than 1.1 mm); femur I with five retrolateral denticles; Tasmania. . . . . *O. saxicola* (Hickman)
    Adult body size large but not very large (carapace length less than 1.1 mm); femur I with four retrolateral denticles; Queensland. . . . . *O. daviesae*, sp. nov.
20. Adult body size small; receptacula just touching medially (Fig. 117); Queensland . . . . . *O. stradbroke*, sp. nov.
    Adult body size medium-sized; receptacula separated medially (Figs 118–119) 21
21. Western Australia . . . . . *O. westraliensis*, sp. nov.
    New South Wales . . . . . *O. janineae*, sp. nov.

Ozarchaea ornata species-group

Diagnosis

Male paracymbium with flattened, 'wing-like' ventral outer process (Figs 75, 79, 83, 87, 90); female receptacula with

'nose-like' inner lobes, separated or just-touching medially (Figs 112–116).

Included species

Ozarchaea bodalla, sp. nov., *O. forsteri*, sp. nov., *O. harveyi*, sp. nov., *O. ornata* (Hickman, 1969); *O. platnicki*, sp. nov., *O. valida*, sp. nov., *O. werrikimbe*, sp. nov., *O. wiangarie*, sp. nov.

Ozarchaea bodalla, sp. nov.

(Figs 112, 125)

Material examined

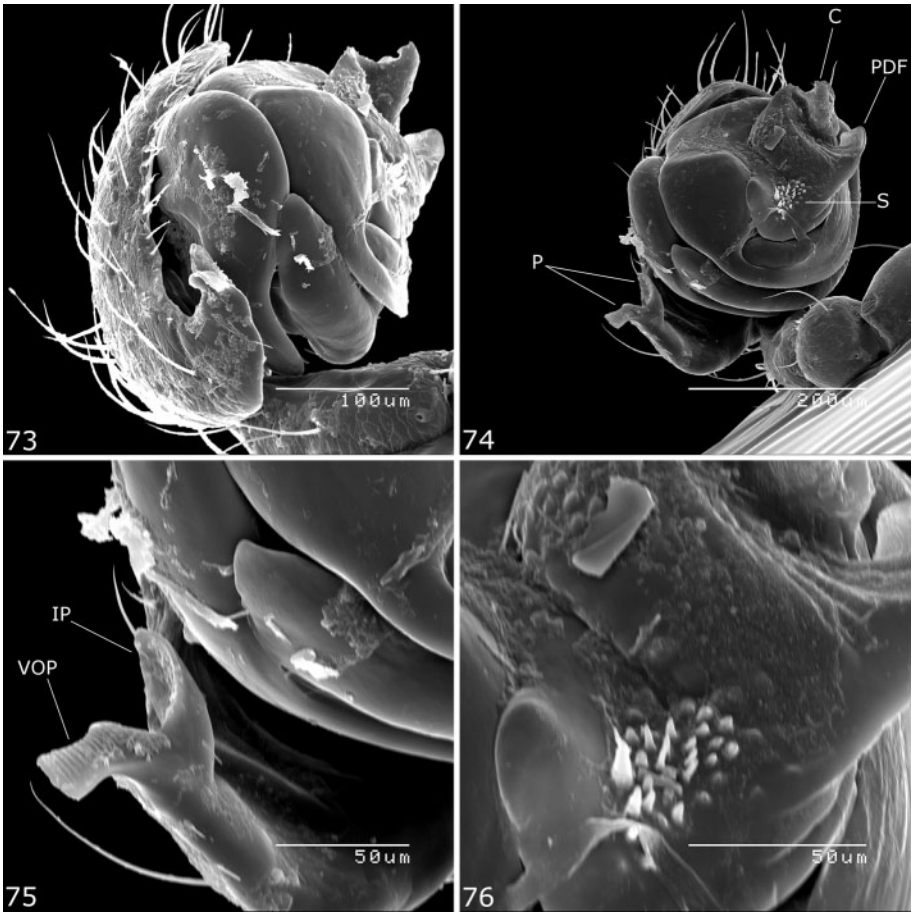
Holotype. ♀, Australia, New South Wales, Bodalla State Forest, Tuross River Road, site 1, 36°10′51″S, 149°56′41″E, 10.iii.1999, R. Harris, H. Smith (AMS KS68139).

Diagnosis

Distinguished from other species in the *Ozarchaea ornata* species-group by the following combination of characters: abdomen pale with light brown marbled patterning; retrolateral femur I with four proximal denticles, with the proximal two denticles closely spaced; shape of female receptacula distinctive, extensively-lobed and 'flower-shaped' (Fig. 112).

Description

Female (*holotype*). Body size: large. Total length 2.02. Carapace 0.94 long, 0.61 wide. Abdomen 1.08 long, 0.91 wide. Colour: pars cephalica mustard-yellow, pars thoracica light brown. Abdomen beige-yellow, with light brown marbled patterning. Legs mustard-yellow. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 6, PTB 2, PTC 3 (11). Abdomen: spinnerets encircled by sclerotised cuticle. Epigyne (Fig. 112): receptacula extensively lobed, 'flower-shaped', with prominent 'nose-like' inner lobes. Legs: femur I with dorsally curved row of four retrolateral denticles, with the proximal two denticles closely spaced.



Figs 73–76. Scanning electron micrographs of male right pedipalp of *Ozarchaea harveyi*: *73*, retrolateral view; *74*, retroventral view; *75*, detail of paracymbium, retroventral view; *76*, detail of cuticular sculpture, retroventral view.

Distribution and habitat

Known only from Bodalla State Forest, between Tuross Head and Narooma, New South Wales (Fig. 125).

Etymology

The specific epithet is a noun in apposition, taken from the type locality.

Ozarchaea forsteri, sp. nov.

(Figs 8, 67, 113)

Material examined

Holotype. ♀, New Zealand, Pouakai Range, Te Pouakai Hut, litter, 1280 m, 39°14′S, 174°02′E, 3.xii.1975, A. K. Walker (OMD).

Diagnosis

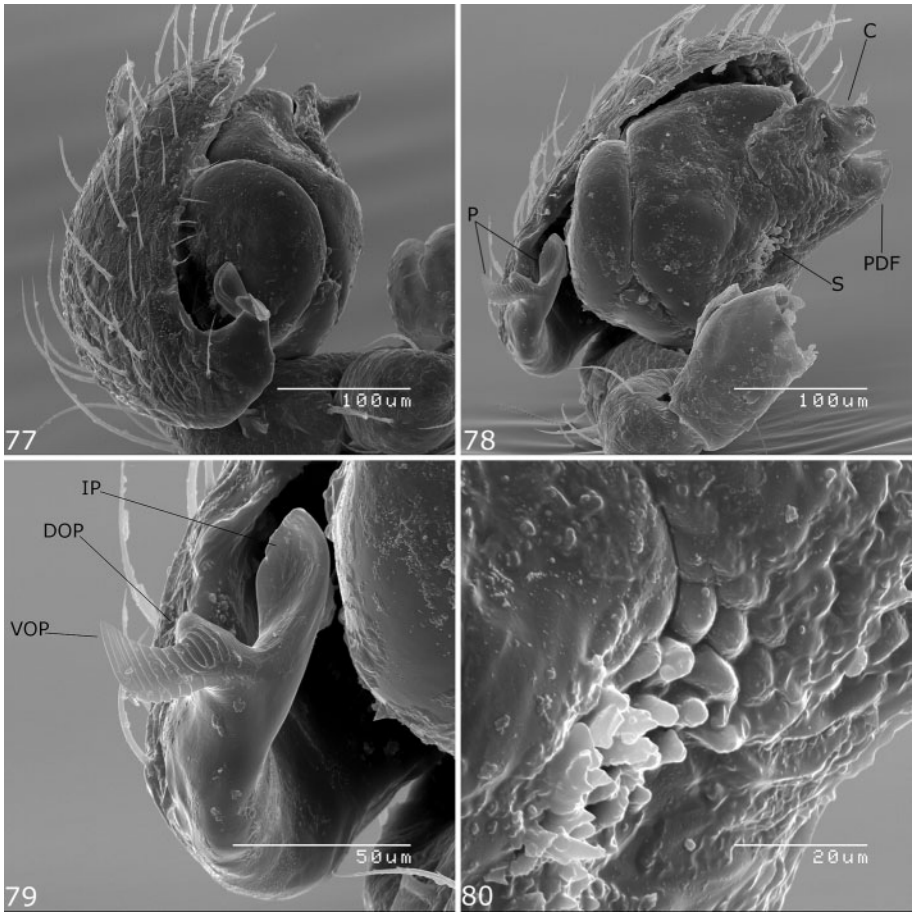
Distinguished from other species in the *Ozarchaea ornata* species-group by the unique dorsal abdominal colour pattern (Fig. 8).

Description

Female (*holotype*). Body size: large. Total length 2.35. Carapace 0.94 long, 0.63 wide. Abdomen 1.41 long, 1.08 wide. Colour: pars cephalica mustard-yellow, pars thoracica dark brown. Abdomen pale mustard-yellow, with broad, dark brown medial stripe extending from anterior edge of abdomen to near spinnerets. Lateral abdomen also with dark brown pigmentation. Legs pale mustard-yellow; femora, tibiae, metatarsi darker brown proximally. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 5, PTB 2, PTC 3 (10). Abdomen: spinnerets encircled by sclerotised cuticle dorsally. Epigyne (Fig. 113): receptacula rounded, with nose-like inner lobes. Legs: femur I with dorsally curved row of four retrolateral denticles.

Distribution and habitat

Known only from the Pouakai Range, Mount Egmont National Park, on the North Island of New Zealand (Fig. 67).



Figs 77–80. Scanning electron micrographs of male right pedipalp of *Ozarchaea ornata*: *77*, retrolateral view; *78*, retroventral view; *79*, detail of paracymbium, retroventral view; *80*, detail of cuticular sculpture, retroventral view.

The holotype female and several juveniles were all collected at over 1000 m altitude, within moss and leaf litter.

Etymology

The specific epithet is a patronym in honour of the late Raymond R. Forster (1922–2000), for his enormous contribution to the study of Pararchaeidae and other south-temperate micro-spiders.

Ozarchaea harveyi, sp. nov.

(Figs 10, 73–76, 115, 127)

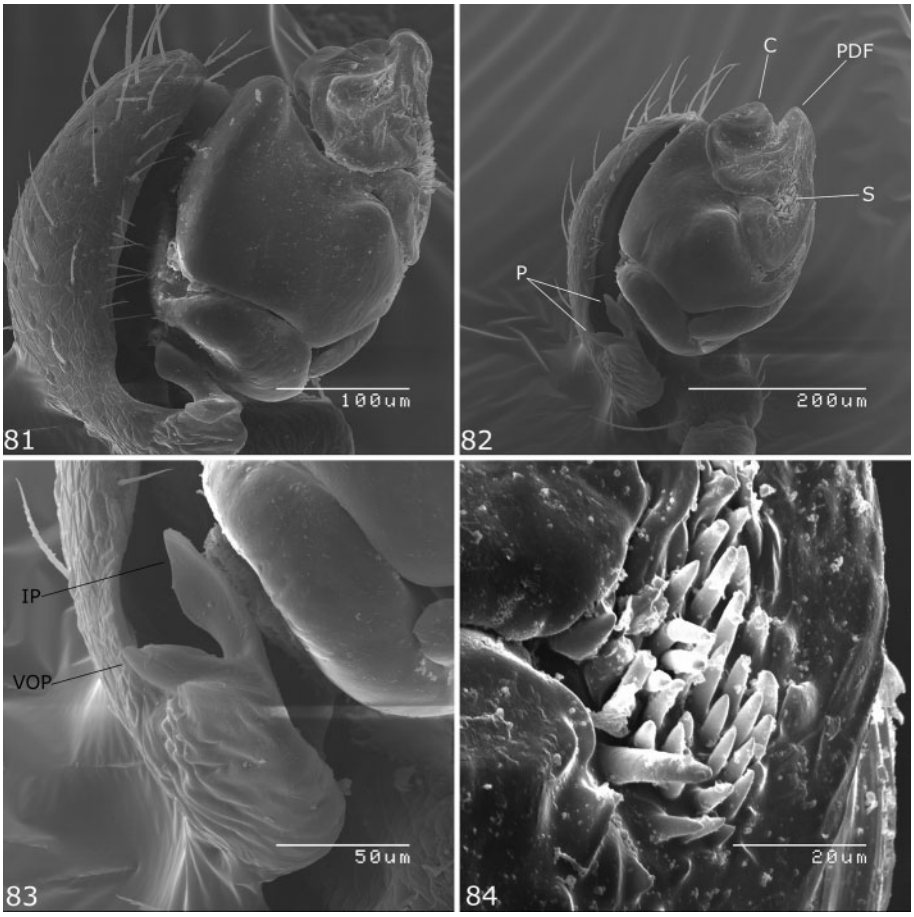
Material examined

Holotype. ♂, Australia, Western Australia, Dale Forest Block, off Brookton Highway, Beraking Pool Road, bark trap on marri tree, 32°13′S, 116°21′E, 26.vi.1999, R. Graham (WAM T46249).

Paratypes. **Western Australia:** allotype ♀, Dryandra Nature Reserve, bark trap on powderbark wandoo, 32°44′S, 116°57′E, 23.x.1999, R. Graham (WAM T47892); 1♀, Dryandra State Forest, intercept trap on Jarrah, 32°46′S, 116°53′E, 26.x.1998, C. Norwood (WAM T46244); 1♀, same data except intercept trap on wandoo, 21.viii.1999, R. Graham (WAM T46245); 1♂, Walpole, tree trap, 34°59′S, 116°44′E, 31.v.1978, S. J. Curry (WAM T46251); 1♂, Nannup, pitfall trap, 33°59′S, 115°46′E, 22.iii.1978, S. J. Curry (WAM T46248); 1♀, Boranup Forest, 32°44′S, 116°57′E, 3.viii.1978, S. J. Curry (WAM T46243); 1♂, Mount Barker, tree trap, 34°39′S, 117°39′E, 30.v.1978, S. J. Curry (WAM T46247); 1♂, Ashendon Road, Carinyah Forest Block, bark trap on marri tree, 32°08′S, 116°11′E, 26.vi.1999, R. Graham (WAM T46242); 1♂, Mount Cooke, wet pitfall, 32°25′S, 116°18′E, 31.vii–19.ix.1991, M. S. Harvey, J. M. Waldock (WAM T46250); 1♂, Dwellingup, tree trap, 32°43′S, 116°04′E, 28.vii.1978, S. J. Curry (WAM T46246); 1♂, Huntley Mine, 5km east of Banksiadale Dam, tree trap on live jarrah tree, 32°39′S, 116°05′E, 29.iv.2005, A. Peck (WAM T63289); 1♂, same data except tree trap on dead jarrah tree (WAM T63290).

Diagnosis

Distinguished from other species in the *Ozarchaea ornata* species-group by the following combination of characters: dorsal abdomen with brown anterior cardiac stripe and brown posterior chevrons (Fig. 10); anterior cardiac stripe posteriorly widened (Fig. 10); ventral outer process of paracymbium rectangular (Fig. 75); female receptacula closely spaced (Fig. 115).

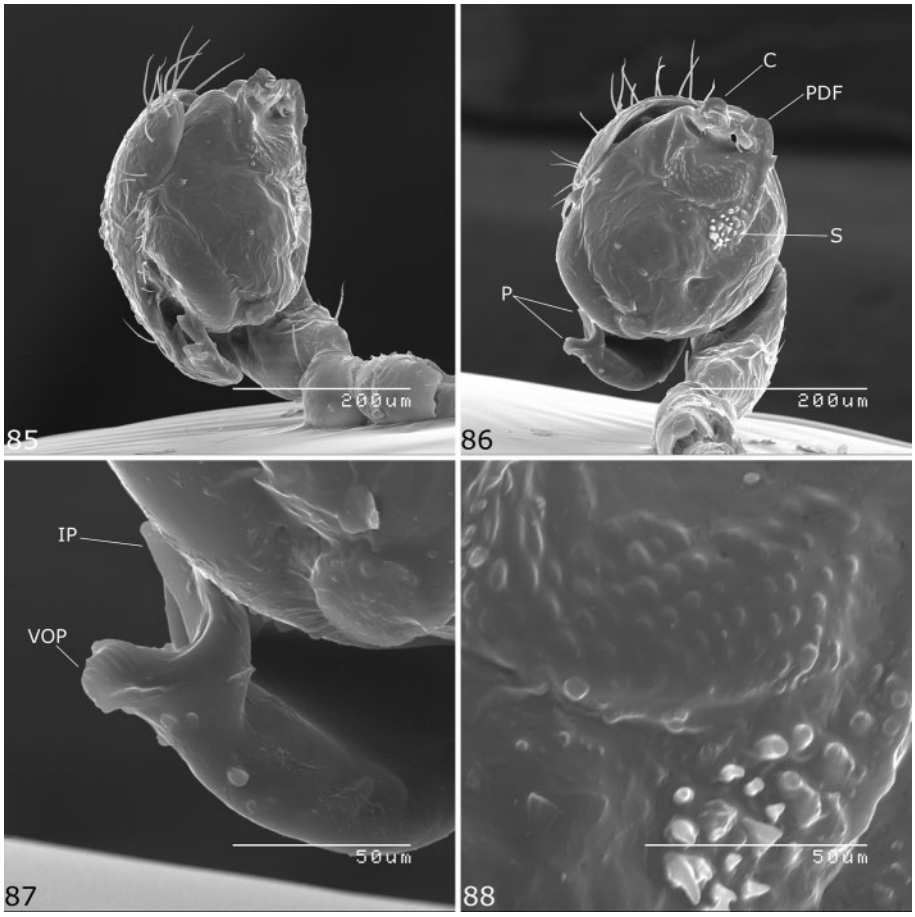


Figs 81–84. Scanning electron micrographs of male right pedipalp of *Ozarchaea valida*: *81*, retrolateral view; *82*, retroventral view; *83*, detail of paracymbium, retroventral view; *84*, detail of cuticular sculpture, retroventral view.

Description

Male (*holotype*). Body size: medium-sized. Total length 1.51. Carapace 0.65 long, 0.45 wide. Abdomen 0.86 long, 0.63 wide. Colour: pars cephalica and medial pars thoracica mustard-yellow, lateral pars thoracica dark grey. Abdomen pale beige-yellow, with dark brown cardiac mark (widest posteriorly), and five dark brown posterior chevrons; each chevron becoming wider posteriorly. Lateral abdomen also with dark brown pigmentation. Legs mustard-yellow. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 5, PTB 2, PTC 3 (10). Abdomen: post-epigastric sclerites fused to anterior sclerite; extending to three-quarters length of VSQ from latter. Small, rectangular dorsal scute, broadly fused to anterior sclerite, extending posteriorly to level of DSP2. Spinnerets encircled by sclerotised cuticle, extending ventrally up to length of VSQ from latter. Pedipalp (WAM T46251; Figs 73–76): paracymbium with broad inner process, small rounded dorsal outer process and flattened, 'wing-like' ventral outer process; ventral outer process rectangular, with transverse ridges. Distal plate with distal conductor, and large prodistal flange. Cuticular sculpture of distal plate: cluster of 10 spine-like and 15 spur-like projections near base of embolus, with numerous mound-like lumps extending to bases of conductor and prodistal flange. Legs: femur I with dorsally curved row of four retrolateral denticles.

Female (*allotype*). Body size: medium-sized. Total length 2.42. Carapace 0.86 long, 0.56 wide. Abdomen 1.56 long, 1.28 wide. Colour: pars cephalica and medial pars thoracica dark mustard-yellow, lateral pars thoracica dark brown. Abdomen pale beige-yellow, with dark brown cardiac mark (widest posteriorly), and four dark brown posterior chevrons; each chevron becoming wider posteriorly. Lateral abdomen also with dark brown pigmentation. Legs pale mustard-yellow; femora, tibiae, metatarsi darker brown proximally. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 5, PTB 2, PTC 3 (10). Abdomen: spinnerets



Figs 85–88. Scanning electron micrographs of male right pedipalp of *Ozarchaea werrikimbe*: *85*, retrolateral view; *86*, retroventral view; *87*, detail of paracymbium, retroventral view; *88*, detail of cuticular sculpture, retroventral view.

surrounded by sclerotised cuticle dorsally. Epigyne (Fig. 115): receptacula rounded, with prominent 'nose-like' inner lobes just touching medially. Legs: femur I with dorsally curved row of five retrolateral denticles.

Distribution and habitat

Known from south-western Western Australia, from south-east of Perth, south to Walpole. Most specimens have been collected from tree traps on eucalypt tree trunks, including marri (*Eucalyptus calophylla*), wandoo (*E. wandoo*) and jarrah (*E. marginata*).

Etymology

The specific epithet is a patronym in honour of Dr Mark Harvey, for collecting many Pararchaeidae from Australia.

Ozarchaea ornata (Hickman), comb. nov.

(Figs 11, 77–80, 114, 126)

Pararchaea ornata Hickman, 1969: 7, figs 21–24. – Forster & Platnick, 1984: 71; Rix, 2005: 144, fig. 1.

Material examined

Holotype. ♀, Australia, Tasmania, Hobart, The Queen's Domain, shaking gorse (*Ulex europaeus*), 42°52′S, 147°19′E, 13.iv.1968, V. V. Hickman (AMS KS6638).

Other material examined. **Tasmania**: 1♂, A3 roadside between Weldborough and Derby, beating low foliage in wet sclerophyll forest, 41°08′53″S, 147°53′23″E, 14.v.2003, L. J. Boutin (QVM 13: 39997); 1♀, 1♂ same data except L. J. Boutin, C. Williams (QVM 13: 39996); 1♀, same data except 20.xi.2003, M. Rix (QMB S66841).

Diagnosis

Distinguished from other species in the *Ozarchaea ornata* species-group by the following combination of characters: dorsal abdomen with brown anterior cardiac stripe and brown posterior chevrons (Fig. 11); anterior cardiac stripe posteriorly tapered (Fig. 11); posterior abdomen with five chevrons (Fig. 11); ventral outer process of paracymbium strongly curved (Fig. 75); female receptacula separated (Fig. 114).

Distribution and habitat

Known from southern and north-eastern Tasmania (Fig. 126). The habitat is temperate sclerophyll forest, where the spiders live among the shaded foliage of dense, spiny shrubs less than 1.5 m in height.

Ozarchaea platnicki, sp. nov.

(Figs 13, 116, 123)

Material examined

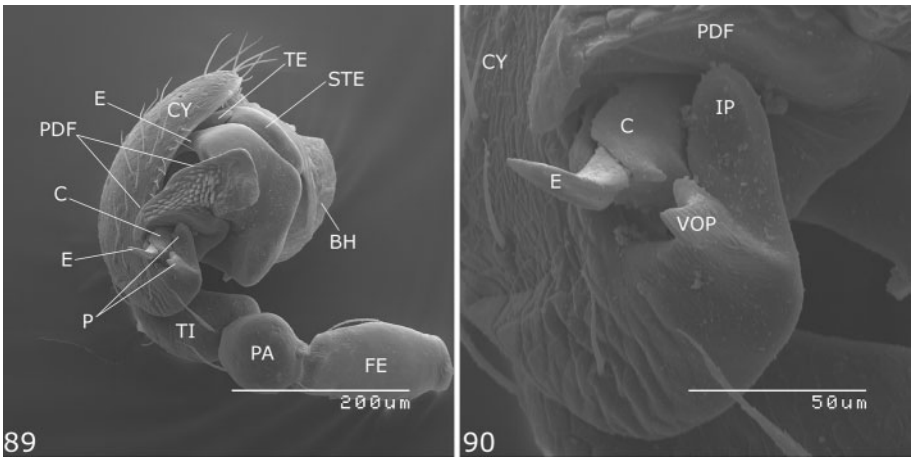
Holotype. ♀, Australia, Queensland, Bellenden Ker Range, Cable Tower 3, pyrethrum knockdown on foliage, 1054 m, 17°16′22″S, 145°52′16″E, 25–31.x.1981, QMB, Earthwatch (QMB S27678).

Diagnosis

Distinguished from other species in the *Ozarchaea ornata* species-group by the dorsal abdominal colour pattern, with a large, light brown wedge-shaped marking (Fig. 13).

Description

Female (*holotype*). Body size: medium-sized. Total length 1.86. Carapace 0.77 long, 0.53 wide. Abdomen 1.09 long, 0.96 wide. Colour: pars cephalica mustard-yellow, pars thoracica dark brown. Abdomen pale beige-yellow, with light brown, slightly marbled, wedge-shaped marking extending from near anal tubercle to past DSP1, tapering anteriorly. Lateral abdomen also with pale brown pigmentation. Legs pale mustard-yellow. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior



Figs 89–90. Scanning electron micrographs of male right pedipalp of *Ozarchaea wiangarie*, showing interaction of palpal sclerites in fully expanded pedipalp: *89*, retrolateral view; *90*, detail of interaction, retrolateral view.

margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 5, PTB 2, PTC 3 (10). Abdomen: spinnerets surrounded by sclerotised cuticle dorsally. Tracheal sclerite absent. Epigyne (Fig. 116): receptacula rounded, 'kidney-shaped', with 'nose-like' inner lobes. Legs: femur I with dorsally curved row of six retrolateral denticles.

Distribution and habitat

Known only from the Bellenden Ker Range in north-eastern Queensland (Fig. 123). The holotype female was collected from foliage in montane tropical rainforest.

Etymology

The specific epithet is a patronym in honour of Professor Norman I. Platnick, for his enormous contribution to the study of pararchaeids and other south-temperate micro-spiders.

Ozarchaea valida, sp. nov.

(Figs 12, 81–84, 125)

Material examined

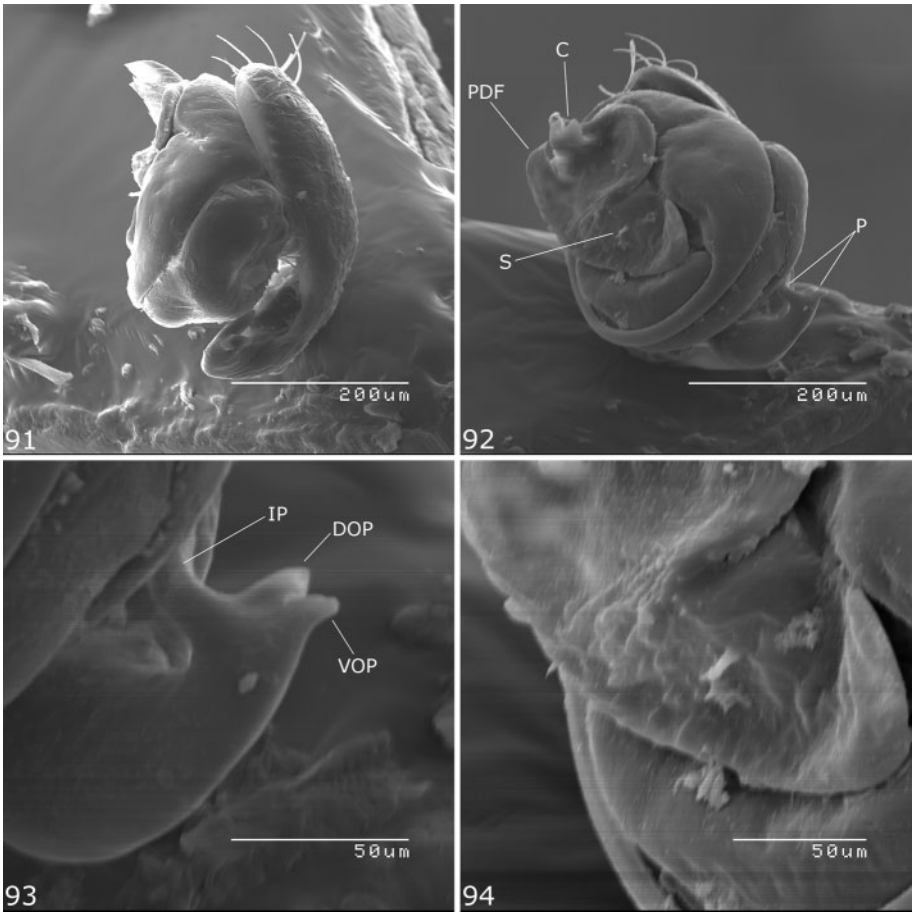
Holotype. ♂, Australia, New South Wales, O'Sullivans Gap Flora Reserve, 11 km north-east of Bulahdelah, flight intercept trap, *c.* 50 m, wet sclerophyll, 32°19′S, 152°16′E, 11.vi–27.viii.1982, S. and J. Peck (AMNH).

Diagnosis

Distinguished from other species in the *Ozarchaea ornata* species-group by the following combination of characters: abdomen dark brown with marbled patterning (Fig. 12); retrolateral femur I with four proximal denticles, with the proximal two denticles closely spaced; distal plate with large cluster of spine-like projections (Fig. 84).

Description

Male (*holotype*). Body size: large. Total length 1.78. Carapace 0.78 long, 0.52 wide. Abdomen 1.00 long, 0.84



Figs 91–94. Scanning electron micrographs of male left pedipalp of *Ozarchaea daviesae*: *91*, retrolateral view; *92*, retroventral view; *93*, detail of paracymbium, retroventral view; *94*, detail of cuticular sculpture, retroventral view.

wide. Colour: carapace brown; pars thoracica darkest. Abdomen brown, with dark brown marbled patterning; dorsal scute dark brown. Legs mustard-yellow; femora, tibiae and metatarsi brown proximally. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 5, PTB 3, PTC 3 (11). Abdomen: post-epigastric sclerites separate from anterior sclerite; extending to length of VSQ from latter. Small, circular, dorsal scute, surrounding DSP1. Spinnerets encircled by sclerotised cuticle, extending ventrally up to length of VSQ from latter. Pedipalp (Figs 81–84): paracymbium with broad inner process, small rounded dorsal outer process and flattened, 'wing-like' ventral outer process; ventral outer process with transverse ridges. Distal plate with distal conductor and large prodistal flange. Cuticular sculpture of distal plate: cluster of 30 spine-like projections around base of prodistal flange. Legs: femur I with dorsally curved row of four retrolateral denticles, with the proximal two denticles closely spaced.

Distribution and habitat

Known only from the Bulahdelah region, between Taree and Newcastle, New South Wales (Fig. 125).

Etymology

The specific epithet is derived from the Latin adjective 'validus', meaning stout, and refers to the shape of this species.

Ozarchaea werrikimbe, sp. nov.

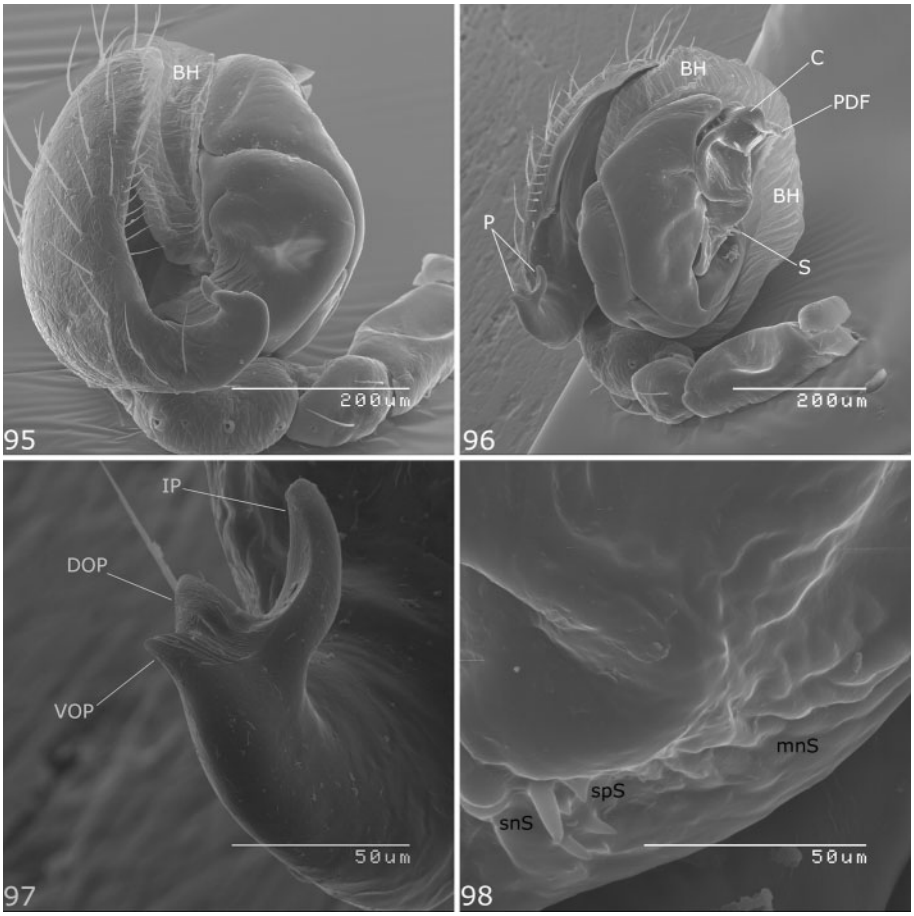
(Figs 9, 85–88, 124)

Material examined

Holotype. ♂, Australia, New South Wales, Werrikimbe National Park, sticky trap on *Eucalyptus obliqua*, 1060 m, 31°10′23″S, 152°09′45″E, 3.vii–8.vii.1998, E. Tasker (AMS KS66666).

Diagnosis

Distinguished from other species in the *Ozarchaea ornata* species-group by the following combination of characters:



Figs 95–98. Scanning electron micrographs of male right pedipalp of *Ozarchaea waldockae*: *95*, retrolateral view; *96*, retroventral view; *97*, detail of paracymbium, retroventral view; *98*, detail of cuticular sculpture, retroventral view.

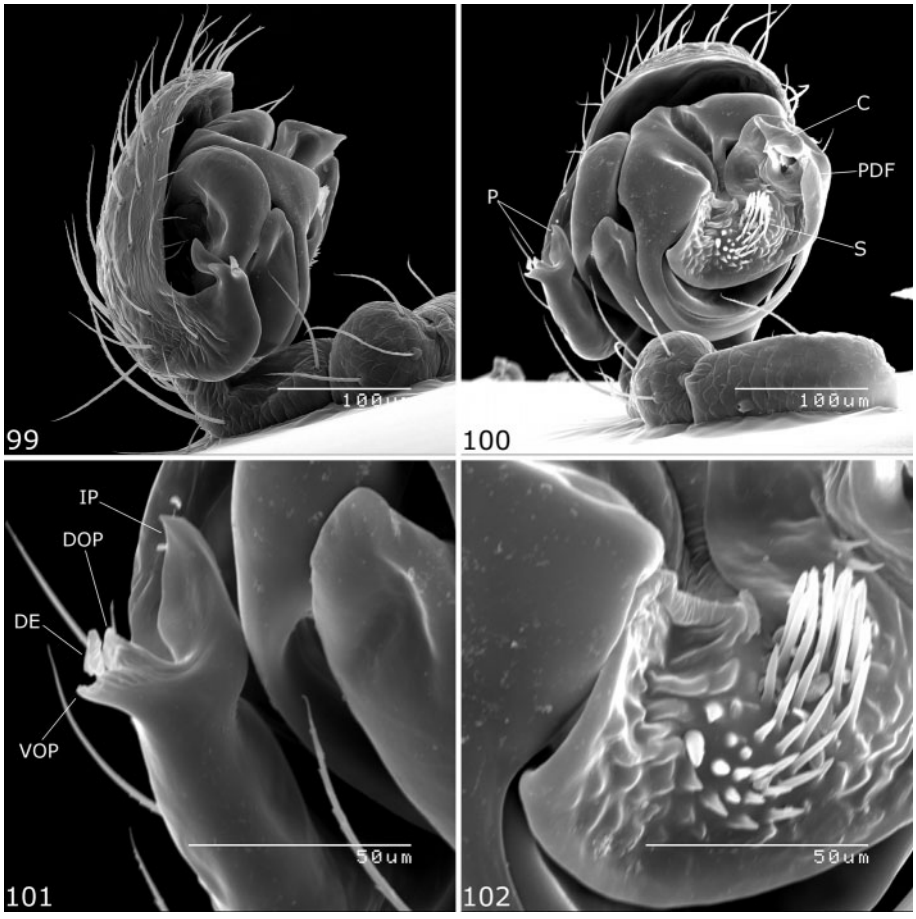
dorsal abdomen with brown anterior cardiac stripe and brown posterior chevrons (Fig. 11); anterior cardiac stripe posteriorly tapered (Fig. 9); posterior abdomen with four chevrons (Fig. 9); ventral outer process of paracymbium rounded (Fig. 87).

Description

Male (*holotype*). In relatively poor condition, with glue from sticky trap still attached. Body size: medium-sized. Total length 1.58. Carapace 0.67 long, 0.46 wide. Abdomen 0.91 long, 0.66 wide. Colour: pars cephalica and medial pars thoracica dark mustard-yellow, lateral pars thoracica dark brown. Abdomen pale beige-yellow, with dark brown dorsal scute and cardiac mark, and four dark brown posterior chevrons; each chevron becoming wider posteriorly. Lateral abdomen also with dark brown pigmentation. Legs mustard-yellow; femora, tibiae and metatarsi brown proximally. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 5, PTB 2, PTC 3 (10). Abdomen: post-epigastric sclerites fused to anterior sclerite; extending to three-quarters length of VSQ from latter. Small, sub-circular dorsal scute, surrounding DSP1. Spinnerets encircled by sclerotised cuticle, extending ventrally up to length of VSQ from latter. Pedipalp: paracymbium with broad inner process, small rounded dorsal outer process and flattened, 'wing-like' ventral outer process; ventral outer process rounded-rectangular, with transverse ridges. Distal plate with distal conductor and large prodistal flange. Cuticular sculpture of distal plate: one spine-like projection and cluster of 15 spur-like projections near base of embolus, with numerous mound-like lumps extending to bases of conductor and prodistal flange. Legs: retrolateral denticles obscured by glue from sticky trap.

Distribution and habitat

Known only from Werrikimbe National Park, near Port Macquarie, in north-eastern New South Wales (Fig. 124). The holotype male was collected from a *Eucalyptus obliqua* tree trunk.



Figs 99–102. Scanning electron micrographs of male right pedipalp of *Ozarchaea janineae*: *99*, retrolateral view; *100*, retroventral view; *101*, detail of paracymbium, retroventral view; *102*, detail of cuticular sculpture, retroventral view.

Etymology

The specific epithet is a noun in apposition, taken from the type locality.

Ozarchaea wiangarie, sp. nov.

(Figs 89–90, 111, 124)

Material examined

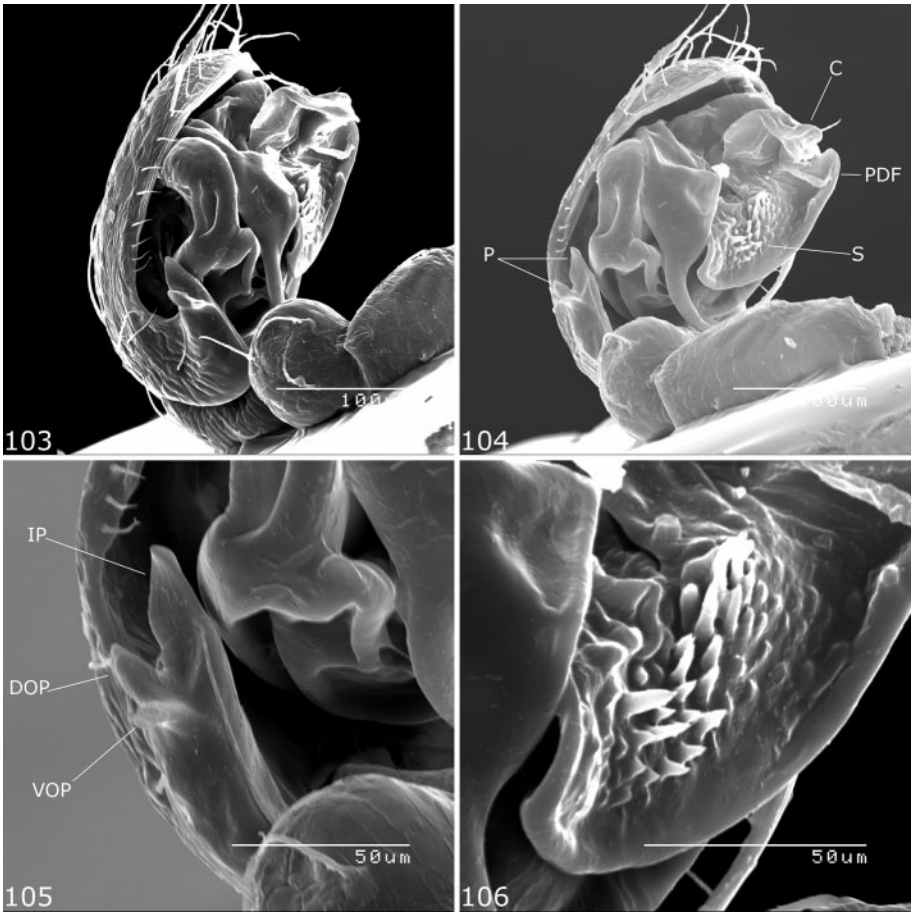
Holotype. ♂, Australia, New South Wales, Kyogle, Wiangarie State Forest, 1000 m, *Nothofagus* grove, 28°27′S, 153°07′E, 21.vi–8.vii.1978, S. and J. Peck (AMNH).

Diagnosis

Distinguished from other species in the *Ozarchaea ornata* species-group by the absence of a dorsal scute on the male abdomen (Fig. 111).

Description

Male (*holotype*). Body size: medium-sized. Total length 1.58. Carapace 0.70 long, 0.47 wide. Abdomen 0.88 long, 0.72 wide. Colour: carapace brown; pars thoracica darkest. Abdomen brown. Legs mustard-yellow; femora and tibiae brown proximally. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 5, PTB 2, PTC 3 (10). Abdomen (Fig. 111): post-epigastric sclerites separate from anterior sclerite; extending to half length of VSQ from latter. Dorsal scute absent. Spinnerets encircled by sclerotised cuticle, extending ventrally up to length of VSQ from latter. Pedipalp (Figs 89–90): paracymbium with broad inner process, small rounded dorsal outer process and flattened, 'wing-like' ventral outer process; ventral outer process rounded-rectangular with transverse ridges. Distal plate with distal conductor and large prodistal flange. Cuticular sculpture of distal plate: large cluster of spine-like and spur-like projections and elongate mound-like lumps extending from near base of embolus to near tip of prodistal flange. Legs: femur I with dorsally curved row of four retrolateral denticles.



Figs 103–106. Scanning electron micrographs of male right pedipalp of *Ozarchaea spurgeon*: *103*, retrolateral view; *104*, retroventral view; *105*, detail of paracymbium, retroventral view; *106*, detail of cuticular sculpture, retroventral view. Note tegulum is slightly shrunken.

Distribution and habitat

Known only from the Kyogle region in north-eastern New South Wales (Fig. 124). The holotype male was collected in Antarctic Beech (*Nothofagus moorei*) forest.

Etymology

The specific epithet is a noun in apposition, taken from the type locality.

Ozarchaea daviesae species-group

Diagnosis

Male dorsal scute very small, transversely-elongate, between DS1 and DS2 (see Rix 2005, fig. 11); male paracymbium with pronged dorsal and ventral outer processes (Figs 93, 97); inner process of paracymbium not proximally widened along dorsal edge (Figs 93, 97); distal plate with less than four spine-like cuticular projections in small cluster (Figs 94, 98); body size large; female receptacula broadly touching along inner margins (Figs 120–122).

Included species

Ozarchaea bondi, sp. nov., *O. daviesae*, sp. nov., *O. saxicola* (Hickman, 1969), *O. waldockae*, sp. nov.

Ozarchaea bondi, sp. nov.

(Figs 122, 126)

Material examined

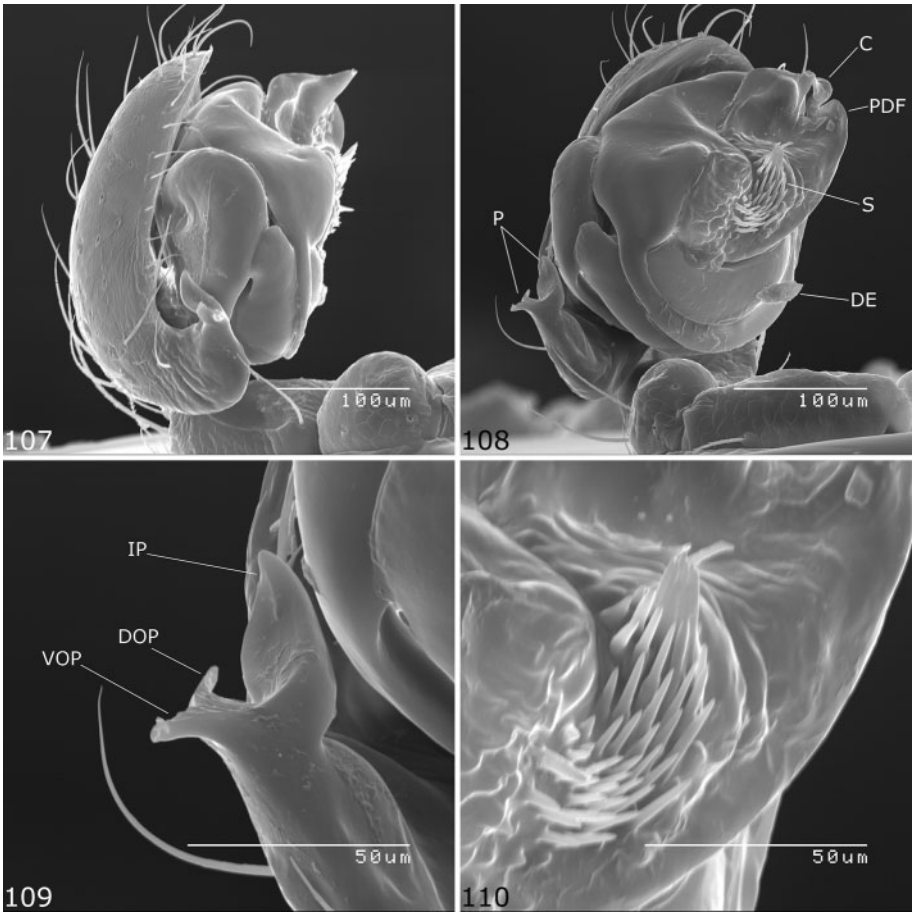
Holotype. ♀, Australia, New South Wales, Bondi State Forest, woodlot 2, 37°07′S, 149°08′E, 29.i.1981, G. Gowing *et al*. (AMS KS71289).

Diagnosis

Distinguished from other species in the *Ozarchaea daviesae* species-group by the remarkable shape of the receptacula, which are large and extensively lobed (Fig. 122).

Description

Female (*holotype*). Partly damaged. Body size: large. Total length 2.27. Carapace 0.93 long, 0.65 wide. Abdomen



Figs 107–110. Scanning electron micrographs of male right pedipalp of *Ozarchaea westraliensis*: *107*, retrolateral view; *108*, retroventral view; *109*, detail of paracymbium, retroventral view; *110*, detail of cuticular sculpture, retroventral view.

1.34 long, 1.11 wide. Colour: pars cephalica mustard-yellow, pars thoracica light brown. Abdomen beige-yellow. Legs pale mustard-yellow; femora, tibiae, metatarsi and tarsi light brown proximally. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 6, PTB 3, PTC 3 (12). Abdomen: spinnerets surrounded by sclerotised cuticle dorsally. Tracheal sclerite present. Epigyne (Fig. 122): receptacula large, extensively lobed, broadly touching along inner margins. Legs: femur I with dorsally curved row of five retrolateral denticles.

Distribution and habitat

Known only from Bondi State Forest, south of Bombala, New South Wales (Fig. 126).

Etymology

The specific epithet is a noun in apposition, taken from the type locality.

Ozarchaea daviesae, sp. nov.

(Figs 91–94, 121, 124)

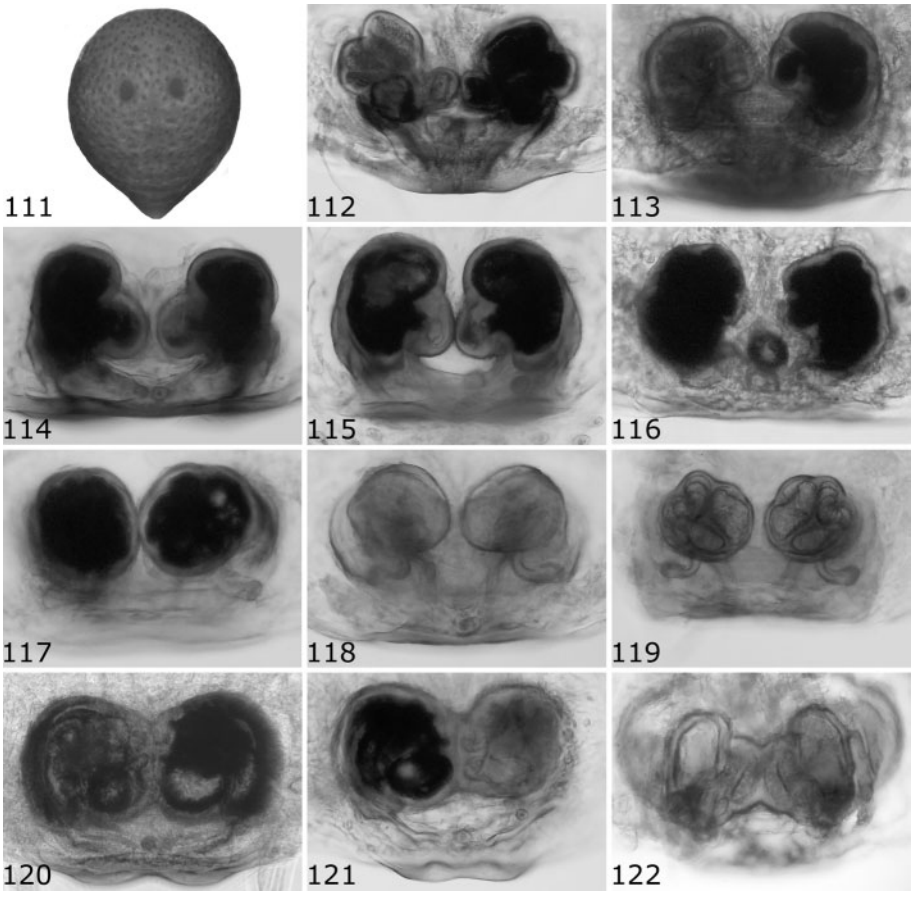
Material examined

Holotype. ♂, Australia, Queensland, Lake Broadwater via Dalby, pitfall trap site 5, 27°21′S, 151°06′E, 22.iv–12.vi.1986, QMB, M. Bennie (QMB S57269).

Paratypes. **Queensland:** allotype ♀, same data as holotype except pitfall trap site 9, 17.v–24.xi.1985 (QMB S37623); 1♀, same data as holotype except 26.iii–17.v.1985 (QMB S57267); 1♂, same data except pitfall trap site 4, 17.v–24.xi.1985 (QMB S57268).

Diagnosis

Distinguished from other species in the *Ozarchaea daviesae* species-group by the following combination of characters: female receptacula circular (Fig. 121); body size large but not very large (carapace length less than 0.85 mm for males; less than 1.1 mm for females; Fig. 17); retrolateral femur I with four proximal denticles.



Figs 111–122. Female epigynes and male dorsal abdomen of species of *Ozarchaea*. *111*, Dorsal abdomen of male *Ozarchaea wiangarie*, showing the absence of a dorsal scute. *112–122*, Receptacula, dorsal view: *112, Ozarchaea bodalla*; *113*, *Ozarchaea forsteri*; *114, Ozarchaea ornata*; *115*, *Ozarchaea harveyi*; *116*, *Ozarchaea platnicki*; *117*, *Ozarchaea stradbroke*; *118*, *Ozarchaea janineae*; *119*, *Ozarchaea westraliensis*; *120*, *Ozarchaea saxicola*; *121*, *Ozarchaea daviesae*; *122*, *Ozarchaea bondi*.

Description

Male (*holotype*). Body size: large. Total length 1.62. Carapace 0.77 long, 0.52 wide. Abdomen 0.85 long, 0.67 wide. Colour: pars cephalica mustard-yellow, pars thoracica dark mustard-yellow. Abdomen beige-yellow. Legs cream; femora, tibiae and metatarsi pale mustard-yellow proximally. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges present on outer surface. Dentition: PTA 6, PTB 2, PTC 3 (11). Abdomen: post-epigastric sclerites separate from anterior sclerite; extending to length of VSQ from latter. Very small, oval dorsal scute, between DS1 and DS2. Spinnerets encircled by sclerotised cuticle, extending ventrally up to length of VSQ from latter. Pedipalp (QMB S57268; Figs 91–94): paracymbium with curved inner process, and triangular, pronged dorsal and ventral outer processes. Distal plate with distal conductor and large prodistal flange. Cuticular sculpture of the distal plate: cluster of three spine-like projections and mound-like lumps near base of embolus. Legs: femur I with dorsally curved row of four retrolateral denticles.

Female (*allotype*). Body size: large. Total length 2.33. Carapace 1.00 long, 0.66 wide. Abdomen 1.33 long, 1.05 wide. Colour: pars cephalica mustard-yellow, pars thoracica dark mustard-yellow. Abdomen beige-yellow. Legs pale mustard-yellow; femora, tibiae, metatarsi, and tarsi mustard-yellow proximally. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 6, PTB 3, PTC 3 (12). Abdomen: spinnerets not surrounded by sclerotised cuticle. Tracheal sclerite present. Epigyne (QMB S57267; Fig. 121): receptacula circular, 'comma-shaped', broadly touching along inner margins. Legs: femur I with dorsally curved row of four retrolateral denticles.

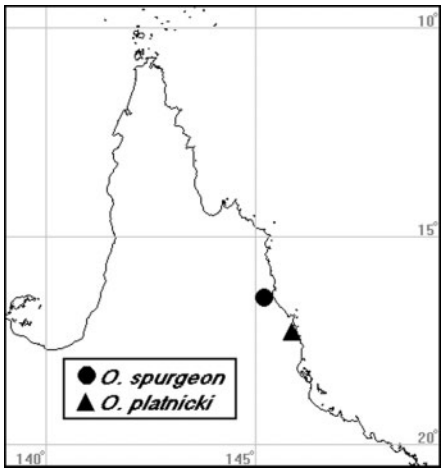


Fig. 123. Collection localities for species of *Ozarchaea* in north-eastern Australia.

Distribution and habitat

Known only from Lake Broadwater Conservation Park, 20 km south-west of Dalby, south-eastern Queensland (Fig. 124). The park protects semi-arid woodland (dominated by *Casuarina*, *Callitris* and *Eucalyptus*), grassland and ephemeral wetland habitats, and a natural freshwater lake. Nothing is known of its biology or current status, despite significant repeated efforts to re-discover it.

Etymology

The specific epithet is a patronym in honour of Dr Valerie Davies, who first isolated this species from pitfall traps (see Davies 1988), for her contribution to the study of Lake Broadwater's spider fauna.

Ozarchaea saxicola (Hickman), comb. nov.

(Figs 120, 126)

Pararchaea saxicola Hickman, 1969: 5, figs 16–20. – Forster & Platnick, 1984: 71; Rix, 2005: 146, figs 2, 6, 11.

Material examined

Holotype. ♂, Australia, Tasmania, Hobart, The Queen's Domain, *in copulo* on underside of loose stone on ground, 42°52′S, 147°19′E, 4.v.1938, V. V. Hickman (AMS KS6639).

Paratypes. **Tasmania:** allotype ♀, same data as holotype (AMS KS6640).

Other material examined. **Tasmania:** 1♀, same data as holotype except under stone (AMS KS54297).

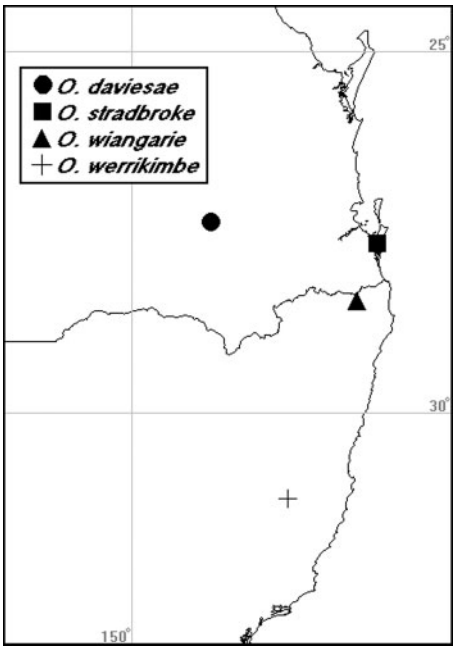


Fig. 124. Collection localities for species of *Ozarchaea* in south-eastern Queensland and north-eastern New South Wales.

Diagnosis

Distinguished from other species in the *Ozarchaea daviesae* species-group by the following combination of characters: female receptacula circular (Fig. 120); body size very large (carapace length greater than 0.85 mm for males; greater than 1.1 mm for females; Fig. 17); retrolateral femur I with five proximal denticles.

Distribution and habitat

Known only from the Queen's Domain, Hobart, Tasmania (Fig. 126). Hickman (1969) recorded that the types were collected from under loose stones on the ground. This species may now be extinct (see Conservation of Pararchaeidae, below).

Ozarchaea waldockae, sp. nov.

(Figs 95–98, 127)

Material examined

Holotype. ♂, Australia, Western Australia, Dongolocking Nature Reserve, pitfall trap DU04, 33°03′00″S, 117°41′03″E, 15.x–1.xi.1999, P. Van Heurck *et al*. CALM Survey (WAM T46378).

Diagnosis

Distinguished from other species in the *Ozarchaea daviesae* species-group by the following combination of characters: body size large but not very large (carapace length less than 0.85 mm for males; less than 1.1 mm for females; Fig. 17); retrolateral femur I with five proximal denticles.

Description

Male (*holotype*). Body size: large. Total length 1.94. Carapace 0.81 long, 0.56 wide. Abdomen 1.13 long, 0.84 wide. Colour: pars cephalica brown, pars thoracica dark brown. Abdomen beige. Legs mustard-yellow; femora, tibiae, metatarsi and tarsi darker mustard-yellow and brown proximally. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges present on outer surface. Dentition: PTA 6, PTB 2, PTC 3 (11). Abdomen: post-epigastric sclerites fused to anterior sclerite; extending to half length of VSQ from latter. Very small, oval dorsal scute, between DS1 and DS2. Spinnerets encircled by sclerotised cuticle, extending ventrally up to length of VSQ from latter. Pedipalp (Figs 95–98): paracymbium with curved inner process, and triangular, pronged dorsal and ventral outer-processes. Distal plate with distal conductor and large prodistal flange. Cuticular sculpture of the distal plate: cluster of three spine-like and three spur-like projections, and mound-like lumps near base of embolus. Legs: femur I with dorsally curved row of five retrolateral denticles.

Distribution and habitat

Known only from Dongolocking Nature Reserve, near Narrogin, in south-western Western Australia (Fig. 127).

Etymology

The specific epithet is a patronym in honour of Julianne Waldock, for her contribution to the study of Western Australian spiders.

Ozarchaea westraliensis species-group

Diagnosis

Male dorsal scute small, circular (Fig. 14); male paracymbium with pronged dorsal and ventral outer processes (Figs 101, 105, 109); inner process of paracymbium proxi-

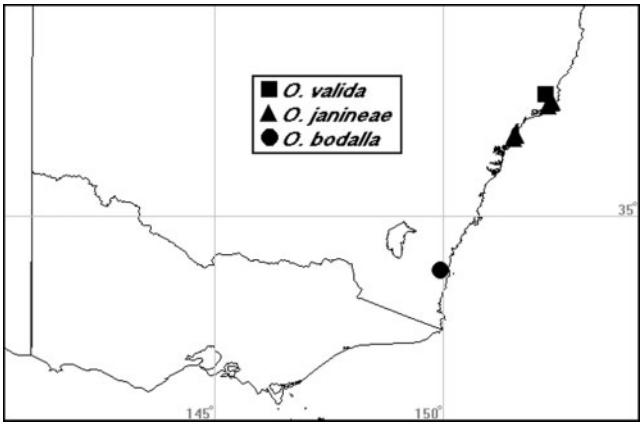


Fig. 125. Collection localities for species of *Ozarchaea* in south-eastern New South Wales.

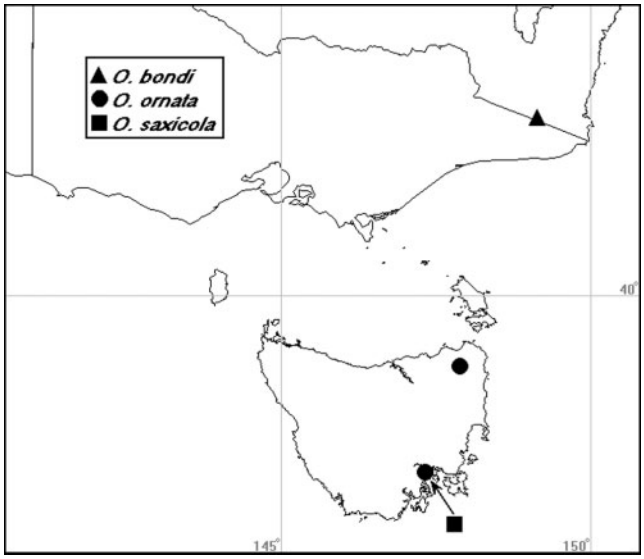


Fig. 126. Collection localities for species of *Ozarchaea* in south-eastern New South Wales and Tasmania.

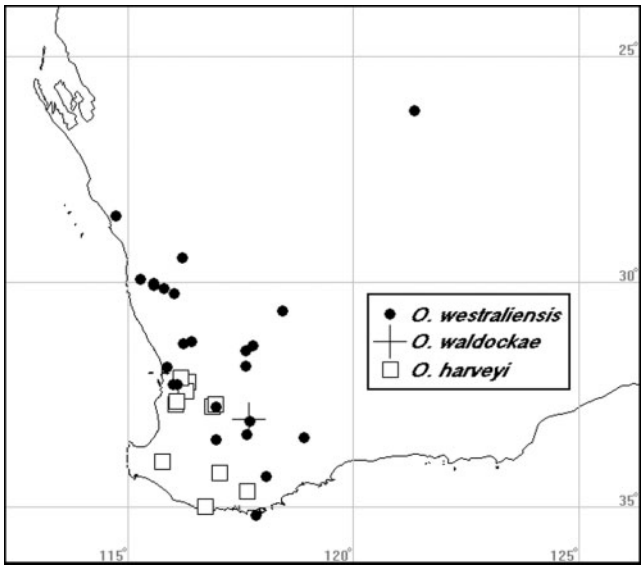


Fig. 127. Collection localities for species of *Ozarchaea* in south-western Western Australia.

mally widened along dorsal edge (Figs 101, 105, 109); distal plate with extensive cluster of spine-like cuticular projections (Figs 102, 106, 110); body size small to medium-sized; female receptacula with rounded, globular distal portions, separate or only just touching along inner margins (Figs 117–119).

Included species

Ozarchaea janineae, sp. nov., *O. spurgeon*, sp. nov., *O. stradbroke*, sp. nov., *O. westraliensis*, sp. nov.

Ozarchaea janineae, sp. nov.

(Figs 99–102, 118, 125)

Material examined

Holotype. ♂, Australia, New South Wales, Myall Lakes National Park, 32°34′45″S, 152°17′27″E, 24.v.1998, L. Wilkie (AMS KS60650).

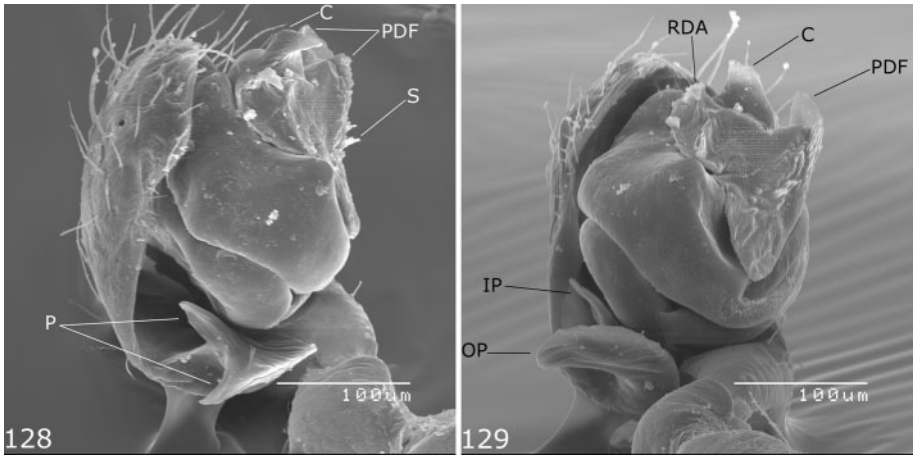
Paratypes. **New South Wales:** allotype ♀, same data as holotype except 32°30′26″S, 152°21′55″E, 30.iv.1997 (AMS KS60642); 1♂, same data except 32°29′22″S, 152°23′53″E, 1.vi.1997 (AMS KS60645); 1♂, same data (AMS KS60644); 1♂, same data (AMS KS60643); 1♂, same data as holotype except 31.v.1997 (AMS KS60649); 1♀, same data except 30.iv.1997 (AMS KS60647); 2♂, Munmorah State Recreation Reserve, 32°13′20″S, 151°34′01″E, 1.v.1997, L. Wilkie (AMS KS60656); 1♂, same data (AMS KS60657); 2♂, same data except 33°12′26″S, 151°34′37″E, 23.v.1998 (AMS KS60655); 1♀, same data except 1.vi.1997 (AMS KS60654); 1♂, same data except 33°12′34″S, 151°34′59″E, 1.v.1997 (AMS KS60653); 1♂, same data except 33°13′09″S, 151°34′15″E (AMS KS60652); 1♀, same data except 16.xii.1996 (AMS KS60651); 1♂, Wyrrabalong National Park, pitfall trap, 33°17′S, 151°33′E, 23.v.1998, L. Wilkie (AMS KS58498); 2♂, same data except 33°16′44″S, 151°32′51″E, 2.vi.1997 (AMS KS60658); 1♀, same data except 2.v.1997 (AMS KS60659); 1♀, same data except 23.v.1998 (AMS KS58499); 1♂, same data except 33°16′47″S, 151°32′40″E, 2.v.1997 (AMS KS60660).

Diagnosis

Distinguished from other species in the *Ozarchaea westraliensis* species-group by the following combination of characters: dorsal and ventral outer processes of the paracymbium spur-like, directed retrolaterally (Fig. 101); distal plate with raised whorl of spine-like cuticular projections (Fig. 102).

Description

Male (*holotype*). Body size: medium-sized. Total length 1.40. Carapace 0.63 long, 0.41 wide. Abdomen 0.77 long, 0.53 wide. Colour: carapace mustard-yellow.



Figs 128–129. Scanning electron micrographs of male right pedipalp of *Pararchaea alba*: *128*, retrodistal view; *129*, retroventral view.

Abdomen beige-yellow. Legs mustard-yellow; femora, tibiae and metatarsi darker mustard-yellow proximally. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 5, PTB 1, PTC 3 (9). Abdomen: post-epigastric sclerites separate from anterior sclerite; extending to length of VSQ from latter. Small, circular dorsal scute, between DS1 and DS2. Spinnerets encircled by sclerotised cuticle, extending ventrally up to length of VSQ from latter. Pedipalp (AMS KS60658; Figs 99–102): paracymbium with broad inner process, and retrolaterally directed, spur-like, pronged dorsal and ventral outer processes. Distal plate with distal conductor and large prodistal flange. Cuticular sculpture of the distal plate: curved cluster of 10 spur-like and more than 20 spine-like projections, and mound-like projections near base of embolus; spine-like projections forming a raised whorl at distal end of cluster. Legs: femur I with dorsally curved row of four retrolateral denticles.

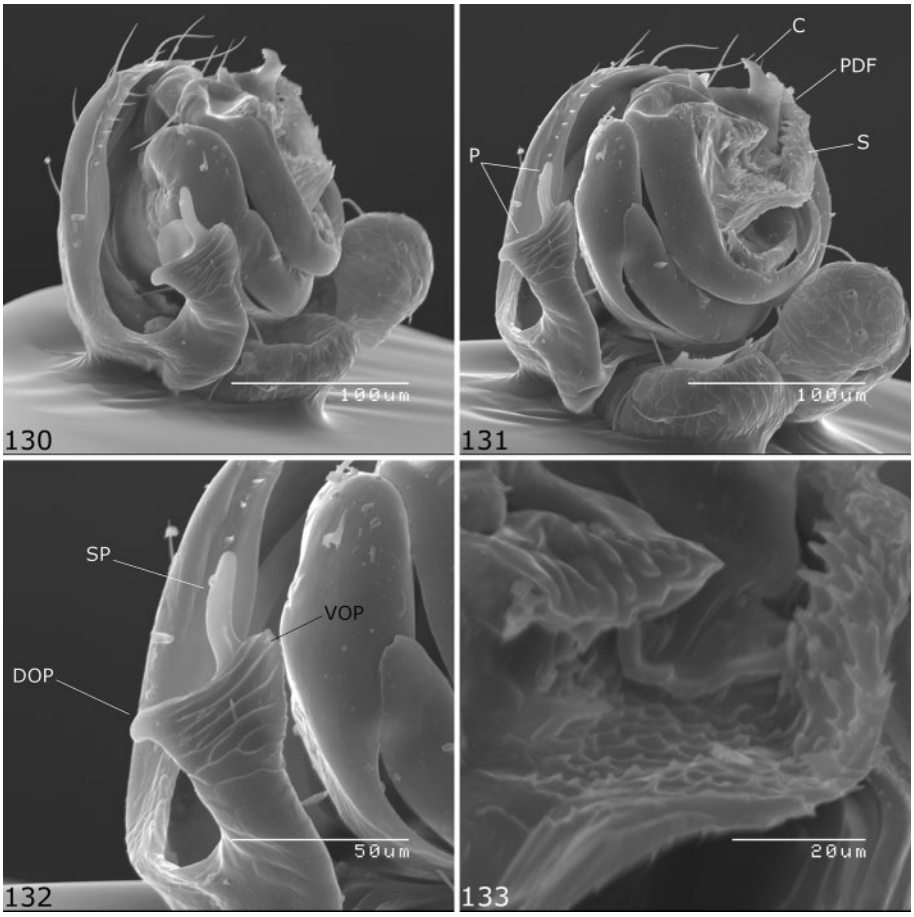
Female (*allotype*). Body size: medium-sized. Total length 1.61. Carapace 0.70 long, 0.44 wide. Abdomen 0.91 long, 0.65 wide. Colour: carapace mustard-yellow. Abdomen beige-yellow. Legs mustard-yellow; tibiae, metatarsi, and tarsi darker proximally. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 5, PTB 1, PTC 3 (9). Abdomen: spinnerets not surrounded by sclerotised cuticle. Tracheal sclerite present. Epigyne (AMS KS60654; Fig. 118): receptacula curved, with rounded, globular distal portions. Legs: femur I with dorsally curved row of four retrolateral denticles.

Distribution and habitat

Known from eastern New South Wales north of Sydney, from Myall Lakes National Park south to Munmorah State Recreation Reserve and Wyrrabalong National Park (Fig. 125).

Etymology

The specific epithet is a patronym in honour of Janine Wojcieszek, for assistance during field work and all her support during this study.



Figs 130–133. Scanning electron micrographs of male right pedipalp of *Westrarchaea pusilla*: *130*, retrolateral view; *131*, retroventral view; *132*, detail of paracymbium, retroventral view; *133*, detail of cuticular sculpture, retroventral view.

Ozarchaea spurgeon, sp. nov.

(Figs 14, 103–106, 123)

Material examined

Holotype. ♂, Australia, Queensland, Mount Spurgeon, flight intercept trap 10, 1140 m, 16°28′S, 145°12′E, 20.xi.1997–8.ii.1998, G. Montieth, A. Cook (QMB S44759).

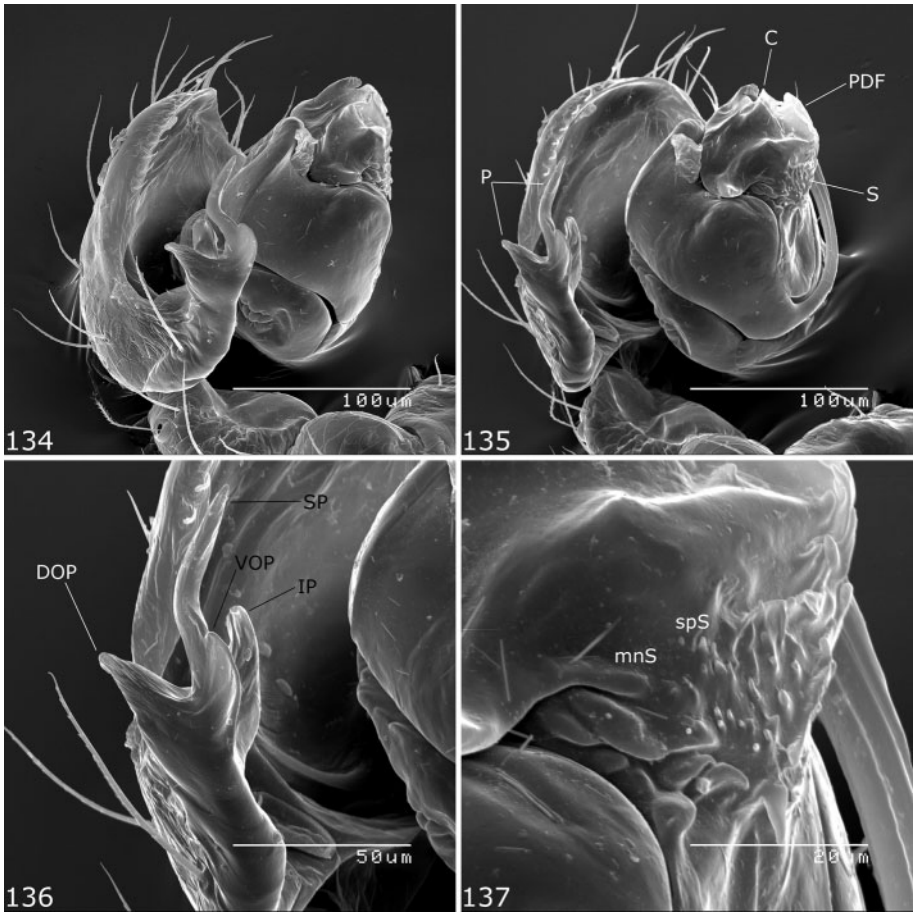
Paratypes. **Queensland:** 1♂, same data as holotype except flight intercept trap 1708 at 1100 m (QMB S44731); 1♂, same data except flight intercept trap at 1100 m, 21.xii.1988–5.i.1989, G. Monteith, ANZSES (QMB S49656).

Diagnosis

Distinguished from other species in the *Ozarchaea westraliensis* species-group by the following combination of characters: dorsal and ventral outer processes of the paracymbium long, directed retrodistally (Fig. 105); distal plate without raised whorl of spine-like cuticular projections (Fig. 106).

Description

Male (*holotype*). Body size: medium-sized. Total length 1.46. Carapace 0.66 long, 0.45 wide. Abdomen 0.80 long, 0.66 wide. Colour: carapace mustard-yellow. Abdomen beige. Legs beige; femora, tibiae, metatarsi and tarsi pale brown proximally. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges present on outer surface. Dentition: PTA 5, PTB 2, PTC 3 (10). Abdomen: post-epigastric sclerites separate from anterior sclerite; extending to length of VSQ from latter. Very small, circular dorsal scute, between DS1 and DS2 (Fig. 14). Spinnerets encircled by sclerotised cuticle, extending ventrally up to length of VSQ from latter. Pedipalp (QMB S44731; Figs 103–106): paracymbium with broad inner process, and divergent, pronged dorsal and ventral outer processes. Distal plate with distal conductor and large prodistal flange. Cuticular sculpture of the distal plate: curved cluster of six spur-like and 15 spine-like projections and mound-like lumps near base of embolus, extending to bases of conduc-



Figs 134–137. Scanning electron micrographs of male right pedipalp of *Westrarchaea sinuosa*: *134*, retrolateral view; *135*, retroventral view; *136*, detail of paracymbium, retroventral view; *137*, detail of cuticular sculpture, retroventral view.

tor and prodistal flange. Legs: femur I with dorsally curved row of four retrolateral denticles.

Distribution and habitat

Known only from high altitude tropical rainforest on the summit of Mount Spurgeon, 12 km north-east of Mount Carbine, north-eastern Queensland (Fig. 123). All specimens have been collected from flight intercept traps at over 1100 m altitude.

Etymology

The specific epithet is a noun in apposition, taken from the type locality.

Ozarchaea stradbroke**,** sp. nov.

(Figs 117, 124)

Material examined

Holotype. ♀, Australia, Queensland, North Stradbroke Island, Gordon mine site, tall shrubland, 27°39′S, 153°24′E, vi.1997, U. Nolte (QMB S41022).

Diagnosis

Distinguished from other species in the *Ozarchaea westraliensis* species-group by the following combination of characters: body size small (female carapace length less than 0.7 mm); female receptacula with inner margins just touching medially (Fig. 117).

Description

Female (*Holotype*). Body size: small. Total length 1.69. Carapace 0.63 long, 0.44 wide. Abdomen 1.06 long, 0.80 wide. Colour: carapace mustard-yellow; pars thoracica darkest. Abdomen beige. Legs cream; femora, tibiae, metatarsi, and tarsi mustard-yellow proximally. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 5, PTB 1, PTC 3 (9). Abdomen: spinnerets not surrounded by sclerotised cuticle. Tracheal sclerite present. Epigyne (Fig. 117): receptacula curved, with rounded, globular distal portions just touching medially. Legs: femur I with dorsally curved row of four retrolateral denticles.

Distribution and habitat

Known only from North Stradbroke Island, south-eastern Queensland (Fig. 124).

Etymology

The specific epithet is a noun in apposition, taken from the type locality.

Ozarchaea westraliensis, sp. nov.

(Figs 107–110, 119, 127)

Material examined

Holotype. ♂, Australia, Western Australia, Perth, Tuart Hill, site TH 1, wet pitfalls, 31°52′49″S, 115°51′30″E, 10.v–20.vi.1993, M. S. Harvey, J. M. Waldock (WAM T46270).

Paratypes. **Western Australia:** allotype ♀, Norman Road, Cardup, wet pitfalls, 32°15′49″S, 116°00′13″E, 16.iv–17.vi.1996, J. M. Waldock, P. West, A. Longbottom (WAM T46368); 2♂, same data as holotype (WAM T63282); 2♂, Casuarina Shire, ~5 km south-west of Nabawa, wet pitfalls, 28°32′07″S, 114°44′07″E, 15.ix.1998–30.iv./18.x.1999, P. Van Heurck (WAM T46386); 2♂, Jouerdine Nature Reserve, wet pitfalls, 30°38′11″S, 118°25′39″E, 15.ix.1998–9.iv./25.x.1999, L. King (WAM T46371); 2♂, Stirling Range National Park, wet pitfalls, 34°17′57″S, 118°04′19″E, 15.x.1999–1.xi.2000, P. Van Heurck *et al*. (WAM T46391); 1♂, Alexander Morrison National Park, wet pitfalls, 30°01′40″S, 115°33′54″E, 15.x.1999–1.xi.2000, P. Van Heurck *et al*. (WAM T46376); 1♂, Dead Mans Swamp Nature Reserve, wet pitfalls, 33°30′06″S, 116°56′54″E, 15.x.1999–25.v./2.xi.2000, L. King (WAM T46372); 1♂, Gura Road, north-west of Narrogin, wet pitfalls, 32°46′09″S, 116°57′08″E, 12.v–16.ix.1998, L. King (WAM T63283); 1♂, Torndirrup National Park, pitfall, 35°10′S, 117°50′E, 25.v–9.xi.1983, P. H. Dyer, J. Lyon (WAM 46269); 1♂, Lorna Glen Station, pitfall, 26°12′07″S, 121°20′45″E, iii–v.2004, K. Brennan *et al*. (WAM T60911); 1♂, Jarrahdale Mine, pitfall, 32°16′S, 116°06′E, iv.1999, K. E. C. Brennan (WAM T54783); 1♂, 1♀, Dongolocking Spring Reserve, wet pitfalls, 33°05′19″S, 117°41′29″E, 15.x.1999–1.xi.2000, P. Van Heurck *et al*. (WAM T46377); 1♂, 1♀, Dumbleyung Lake, wet pitfalls, 33°22′44″S, 117°38′31″E, 15.x.1999–1.xi.2000, P. Van Heurck *et al*. (WAM T63284); 1♀, West Perenjori Nature Reserve, wet pitfalls, 29°27′52″S, 116°12′36″E, 15.ix.1998–2.iv/18.x.1999, L. King (WAM T46385); 1♀, Durokoppin Nature Reserve, wet pitfalls, 31°24′09″S, 117°45′32″E, 22.v–22.ix.1998, L. King (WAM T46384); 1♀, Heitmans Scrub, 31°31′S, 117°37′E, 3–14.xi.1988, D. Mitchell *et al*. (WAM T46252); 1♀, Eneabba Mine, pitfall, 29°56′S, 115°16′E, 24–31.viii.1998, L. Bisevic (WAM T63291); 1♀, same data except viii.1998 (WAM T63292); 2♀, Julimar Conservation Park, 31°21′21″S, 116°13′04″E (WAM T46383); 1♀, south of Greenhead Road, wet pitfalls, 30°04′15″S, 115°34′07″E, 15.x.1999–1.xi.2000, P. Van Heurck *et al*. (WAM T46375); 1♀, Marchagee Track, Waltheroo National Park, wet pitfalls, 30°08′04″S, 115°47′45″E, 15.x.1999–1.xi.2000, P. Van Heurck *et al*. (WAM T46374); 1♀, Drummond Nature Reserve, wet pitfalls, 31°18′37″S, 116°23′59″E, 15.ix.1998–22.iv./4.xi.1999, P. Van Heurck (WAM T46382); 1♀, Lake Magenta Nature Reserve, wet pitfalls, 33°26′29″S, 118°54′29″E, 15.x.1999–1.xi.2000, P. Van Heurck *et al*. (WAM T46389); 1♀, Gundaring Nature Reserve, wet pitfalls, 31°51′13″S, 117°37′08″E, 30.x.1997–27.v.1998, P. Van Heurck, N. Guthrie (WAM T46390); 1♀, Jingemia Hill, Waltheroo National Park, wet pitfalls, 30°15′21″S, 116°01′17″E, 15.x.1999–1.xi.2000, P. Van Heurck *et al*. (WAM T46373).

Diagnosis

Distinguished from other species in the *Ozarchaea westraliensis* species-group by the following combination of characters: dorsal and ventral outer processes of the paracymbium spine-like, widely divergent (Fig. 109); distal plate with raised whorl of spine-like cuticular projections (Fig. 102).

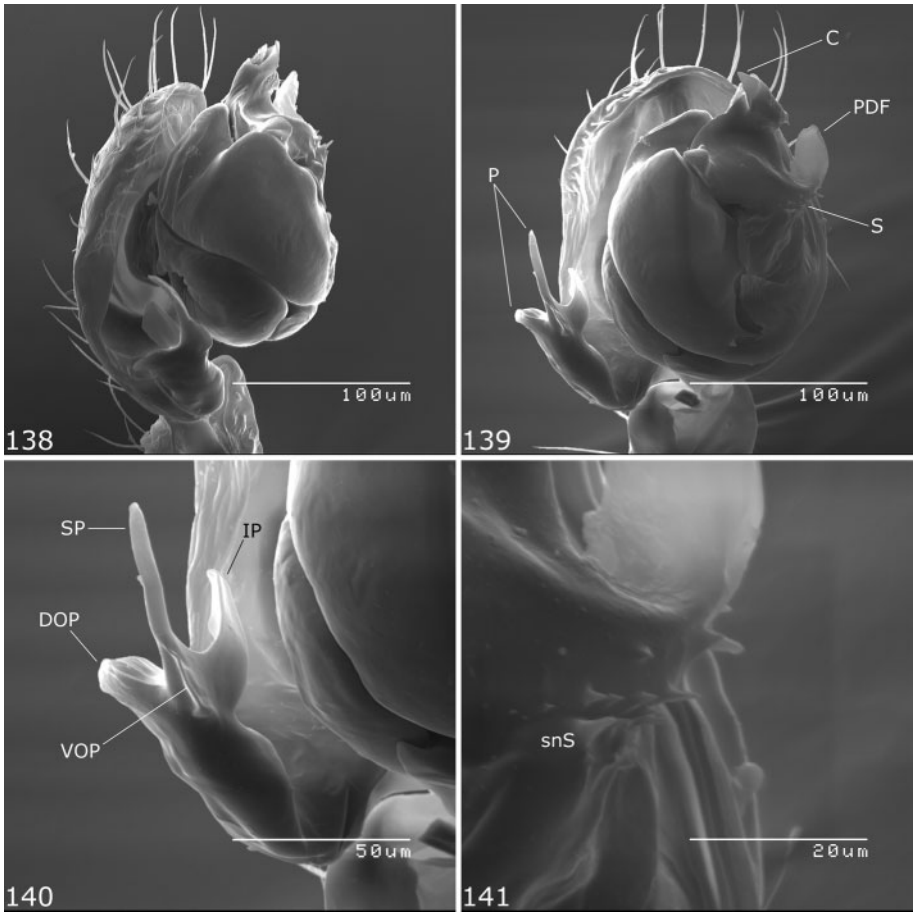
Description

Male (*holotype*). Body size: medium-sized. Total length 1.42. Carapace 0.62 long, 0.42 wide. Abdomen 0.80 long, 0.56 wide. Colour: carapace dark mustard-yellow. Abdomen cream, with mustard-yellow dorsal scute. Legs cream; femora, tibiae, metatarsi and tarsi mustard-yellow proximally. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges present on outer surface. Dentition: PTA 6, PTB 1, PTC 3 (10). Abdomen: post-epigastric sclerites separate from anterior sclerite; extending to length of VSQ from latter. Medium-sized, rectangular dorsal scute, extending from behind anterior sclerite to between DS3 and DS4 (in some specimens only a small, circular dorsal scute surrounding DSP1). Spinnerets encircled by sclerotised cuticle, extending ventrally up to length of VSQ from latter. Pedipalp (WAM T46270; Figs 107–110): paracymbium with broad inner process, and widely-divergent, spine-like, pronged dorsal and ventral outer processes. Distal plate with distal conductor and large prodistal flange. Cuticular sculpture of the distal plate: curved cluster of more than 30 spine-like projections and mound-like lumps near base of embolus; spine-like projections forming a raised whorl at distal end of cluster. Legs: femur I with dorsally curved row of four retrolateral denticles.

Female (*allotype*). Body size: medium-sized. Total length 1.78. Carapace 0.69 long, 0.50 wide. Abdomen 1.09 long, 0.77 wide. Colour: carapace dark mustard-yellow. Abdomen beige-yellow. Legs mustard-yellow; femora, tibiae, metatarsi and tarsi darker mustard-yellow proximally. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 6, PTB 1, PTC 3 (10). Abdomen: spinnerets surrounded by sclerotised cuticle dorsally. Tracheal sclerite present. Epigyne (WAM T46252; Fig. 119): receptacula curved, with rounded, globular distal portions. Legs: femur I with dorsally curved row of four retrolateral denticles.

Distribution and habitat

Known from central and south-western Western Australia, where it is widespread (Fig. 127).



Figs 138–141. Scanning electron micrographs of male right pedipalp of *Westrarchaea spinosa*: *138*, retrolateral view; *139*, retroventral view; *140*, detail of paracymbium, retroventral view; *141*, detail of cuticular sculpture, retroventral view.

Etymology

The specific epithet refers to the Western Australian distribution of this species.

Genus ***Pararchaea*** Forster

Pararchaea Forster, 1955: 397. – Hickman, 1969: 3; Forster & Platnick, 1984: 71; Rix, 2005: 137.

Type species: *Pararchaea alba* Forster, 1955, by original designation.

Diagnosis

The genus *Pararchaea*, represented only by *P. alba*, can be distinguished from all other Pararchaeidae except *Westrarchaea* and *Forstrarchaea* by the absence of a dorsal scute on the male abdomen (Fig. 15), from *Westrarchaea* and *Forstrarchaea* by the presence of reduced AME (Fig. 15), and additionally from *Forstrarchaea* by the presence of proximal retrolateral denticles on femur I.

Description

A monotypic genus of medium-sized (Fig. 17), pale Pararchaeidae, known only from New Zealand.

Cephalothorax. Carapace, when viewed laterally, rhomboidal. Eight eyes in two rows; laterals pearly-white, contiguous; AME small, separated, dark-coloured; PME pearly-white, well separated from each other and from AME.

Chelicerae. Promargin adjacent to fang with three groups (PTA, PTB, PTC) of stout peg teeth; PTA with five teeth directly adjacent to non-extended fang; PTC with three larger teeth on promargin of outer surface; PTB with two teeth between PTA and PTC. Outer surface of paturon of males without transverse stridulatory ridges.

Legs. Femur I with proximal, dorsally curved row of retrolateral denticles.

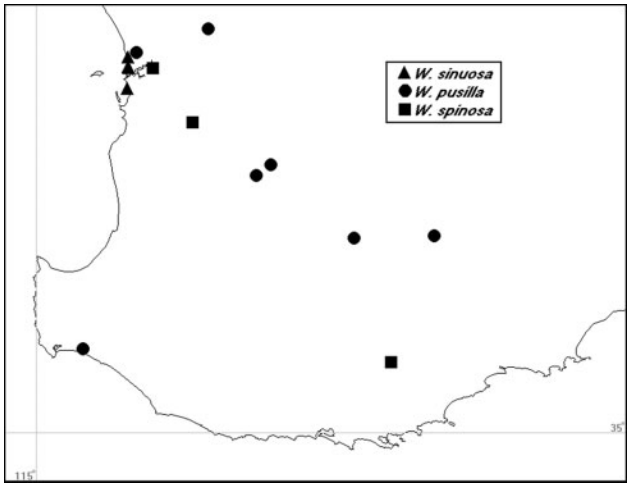


Fig. 142. Collection localities for species of *Westrarchaea* in south-western Western Australia.

Abdomen. Abdomen, when viewed dorsally, elongate-oval, without tubercles. Dorsal scute absent on males. Post-epigastric sclerites present on males and females; small and square or triangular on females and males. Six spinnerets, fully developed; encircled by sclerotised cuticle on males, surrounded dorsally and ventrally by separate sclerites on females. Posterior tracheal spiracle situated closely anterior to colulus, surrounded by extended spinneret sclerite, or by separate tracheal sclerite on females.

Male genitalia. Male palpal patella and tibia without processes. Cymbium spoon-shaped with prominent retrolateral apophysis (paracymbium) proximally. Paracymbium twisted, with broad, curved outer process and inner process (Figs 128–129). Bulb large, extending over full length of cymbium; embolus spinous, arising from base and curving around prolateral margin of bulb. Sclerotised distal plate situated over bulb, distal to base of embolus. Distal plate with distal apophysis forming conductor, large, twisted prodistal flange, prolateral sheath around embolus and small retrodistal apophysis. Mound-like, spur-like and spine-like cuticular sculpture present on distal plate (Figs 128–129).

Female genitalia. Epigyne with pair of separate, thick-walled, 'flower-shaped' receptacula (Fig. 56), composed of internal systems of ducts and chambers; a single distinct fertilisation duct leads from each receptaculum into bursal cavity.

Distribution

Pararchaea alba is known from New Zealand, where it has been found on the southern half of the North Island, throughout the South Island, and on Codfish Island west of Stewart Island (Fig. 67).

Included species

Pararchaea alba Forster, 1955.

Pararchaea alba Forster

(Figs 15, 56, 67, 128–129)

Pararchaea alba Forster, 1955: 399, figs 1–4, 16–19, 25–26. – Forster & Platnick, 1984: 71, figs 214–219, 230–234; Rix, 2005: 138.

Material examined

New Zealand: 1♂, 1♀, Kepler Track, Lake Te Anau, sifting moss in *Nothofagus* forest, 42°25′S, 167°40′E, 21.iv.1995, C. Griswold, T. Meikle (CAS); 1♀, Orongorongo Valley, emergence trap, 41°14′S, 175°05′E, 15.ii/1.iii.1993, B. M. Fitzgerald (MNZ); 1♂, Hokitika River Gorge, forest litter, 42°43′S, 170°57′E, 17.iii.1980, A. Newton, M. Thayer (AMNH); 1♀, Lake Mahinapua Scenic Reserve, forest litter, 42°48′S, 170°55′E, 22.iii.1980, A. Newton, M. Thayer (AMNH); 5♀, Lewis Pass, 42°23′S, 172°24′E, 25.iv.1977 (OMD); 1♀, same data (OMD); 1♂, Lake Monowai, 45°52′S, 167°27′E, 13.iii.1981, R. R. Forster (OMD); 1♂, Monowai, ex moss, 45°52′S, 167°27′E, 15.i.1971, R. R. Forster (OMD); 2♀, same data (OMD); 1♂, 1♀,

Codfish Island, Summit Track, moss and lichens, 46°47′S, 167°38′E, 28.xi.1981, B. A. Holloway (LRA); 2♀, Makarora Valley, 44°19′S, 169°10′E, 12.xii.1977, R. R. Forster (OMD); 1♀, Cameron's Flat, Makarora, beech forest, 44°19′S, 169°10′E, 13.iii.1966, R. R. Forster (OMD); 5♀, Piano Flat, Waiaka Forest, coordinates unknown, ii.1986, R. R. Forster (OMD); 1♂, 1♀, south of Harihari, 43°09′S, 170°33′E, 7.ii.1965, N. A. Walker (OMD); 1♂, 1♀, Lake Hauroko, 46°S, 167°20′E, 13.iii.1981, R. R. Forster (OMD); 1♀, Fletcher Creek, Nelson, litter, 41°59′S, 171°53′E, 7.iii.1972, J. McBurner (OMD); 1♀, Shenandoah Saddle, 41°52′S, 172°15′E, 16.viii.1966, C. L. Winton (OMD); 4♀, Maruia Saddle, moss, 42°11′S, 172°13′E, 23.iii.1965, B. B. Given (OMD); 1♀, Jackson Bay, 43°58′S, 168°42′E, 18.iii.1966, R. R. Forster (OMD); 1♀, State Forest Island, Pakawau, Nelson, moss, 40°36′S, 172°41′E, 28.vi.1971, J. S. Dugdale (OMD); 1♀, Taumarunui, moss in beech forest, 38°53′S, 175°16′E, 18.i.1967, K. A. J. Wise (OMD); 1♀, Whangamoa, pitfall, 41°10′S, 173°32′E, 15.ix.1966, J. I. Townsend (OMD); 1♀, Flagstaff, Hochstetter Range, litter, 41°16′S, 175°38′E, 9.xi.1972, J. S. Dugdale (OMD).

Diagnosis

As for genus.

Distribution and habitat

As for genus.

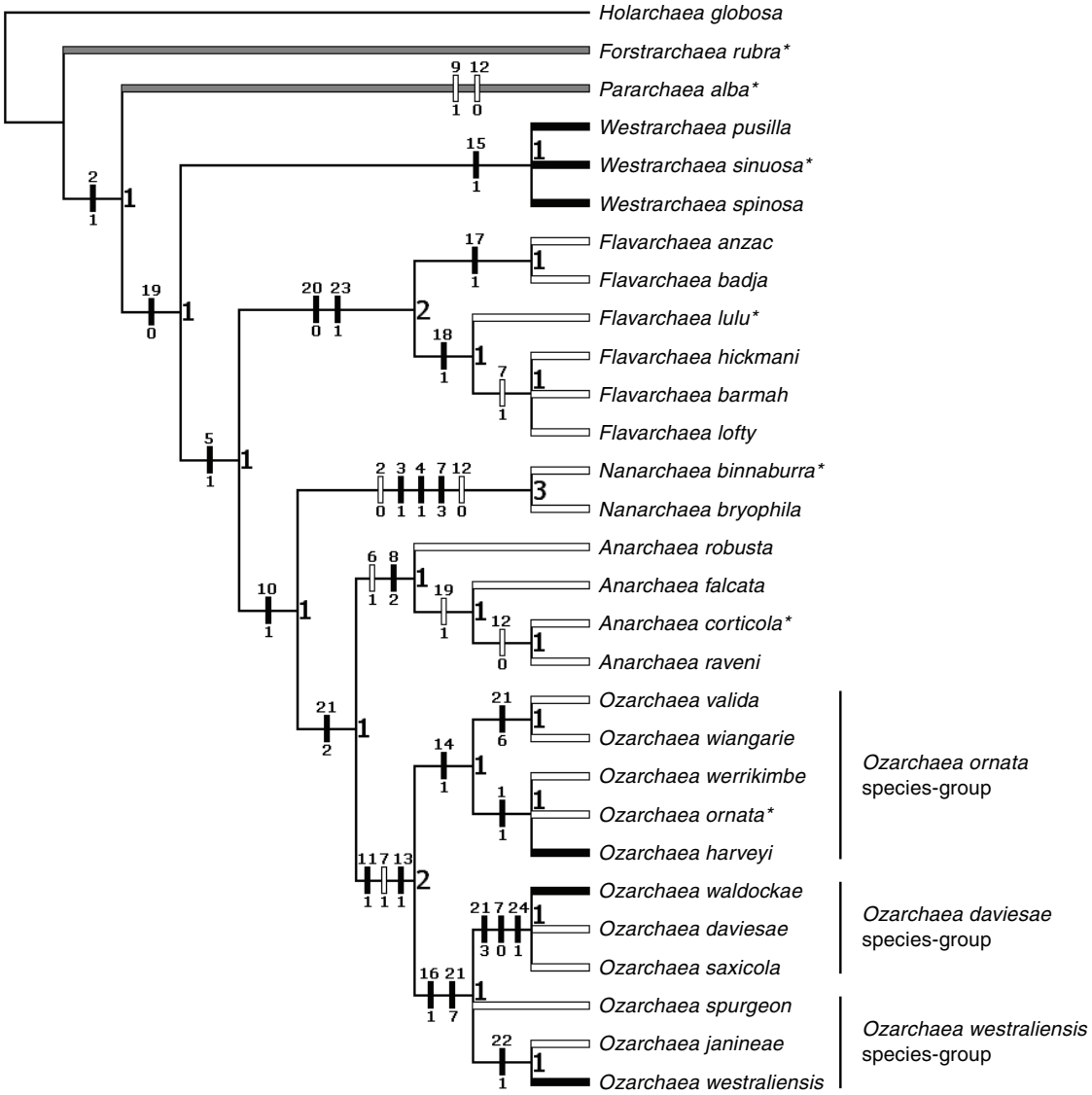


Fig. 143. Most parsimonious cladogram for the Pararchaeidae, based on a cladistic analysis with NONA 2.0 (unordered, unsupported nodes hard collapsed, length 43 steps, consistency index 0.83, retention index 0.93). Terminal taxa are represented with widened horizontal bars according to their distribution: open bars for eastern, southern or south-eastern Australia; closed bars for south-western Australia; and shaded bars for New Zealand. Type species are highlighted (*), and unambiguous characters and character states are numbered, with homoplasious states represented by open vertical bars. Species autapomorphies are not shown. Larger numbers to the right of nodes denote Bremer support (or decay) indices.

Genus ***Westrarchaea***, gen. nov.

Type species: *Westrarchaea sinuosa*, sp. nov.

Diagnosis

Species of *Westrarchaea* can be distinguished from all other Pararchaeidae except *Pararchaea* and *Forstrarchaea* by the absence of a dorsal scute on the male abdomen (Fig. 7), and from both *Pararchaea* and *Forstrarchaea* by the south-western Western Australian distribution. Further distinguished from other pararchaeid genera by the presence of a spine-like outer process on the paracymbium (Figs 132, 136, 140). *Ozarchaea wiangarie* is the only other known Australian pararchaeid species in which the male dorsal scute is absent.

Description

Small Pararchaeidae (Fig. 17), cream or yellow in colour, restricted to south-western Western Australia.

Cephalothorax. Carapace, when viewed laterally, rhomboidal. Eight eyes in two rows; laterals pearly-white, contiguous; AME separated, dark-coloured; PME pearly-white, well separated from each other and from AME.

Chelicerae. Promargin adjacent to fang with three groups (PTA, PTB, PTC) of stout peg teeth; PTA with 3–4 contiguous teeth directly adjacent to non-extended fang; PTC with three larger teeth on promargin of outer surface; PTB with 1–2 teeth between PTA and PTC. Outer surface of paturon of males with or without transverse stridulatory ridges.

Legs. Femur I with proximal, dorsally curved row of retrolateral denticles.

Abdomen. Abdomen, when viewed dorsally, elongate-oval, without tubercles. Dorsal scute absent on males. Post-epigastric sclerites present on males and females; small and square or triangular on females, enlarged on males. Six spinnerets, fully developed; encircled by sclerotised cuticle. Posterior tracheal spiracle situated closely anterior to colulus, surrounded by extended spinneret sclerite.

Male genitalia. Male palpal patella and tibia without processes. Cymbium spoon-shaped with prominent retrolateral apophysis (paracymbium) proximally, of variable (species-specific) shape. Paracymbium with short, flange-like inner process, dorsal and ventral outer processes and large spine-like outer process (Fig. 136). Bulb large, extending over full length of cymbium; embolus spinous, arising from base and curving around prolateral margin of bulb. Sclerotised distal plate situated over bulb, distal to base of embolus. Distal plate with distal apophysis forming conductor, large prodistal flange, and prolateral sheath around embolus (Fig. 135). Mound-like, spur-like (Fig. 137) or spine-like (Fig. 141) cuticular sculpture present on distal plate.

Female genitalia. Epigyne with pair of separate, thick-walled, variously lobed receptacula (Figs 32–34), composed of internal systems of ducts and chambers; a single distinct fertilisation duct leads from each receptaculum into bursal cavity.

Distribution

Species of *Westrarchaea* are known only from south-western Western Australia.

Etymology

The generic name is derived from a contraction of ‘Western Australia’, and refers to the Western Australian distribution of species in this genus. The gender is considered feminine.

Included species

Westrarchaea pusilla, sp. nov., *W. sinuosa*, sp. nov., *W. spinosa*, sp. nov.

Key to species of ***Westrarchaea***

1. Males 2
   Females 4
2. In retrolateral view, spine-like outer process of paracymbium directed anteroventrally (Figs 130, 134); inner process of paracymbium rounded (Figs 130, 134) 3

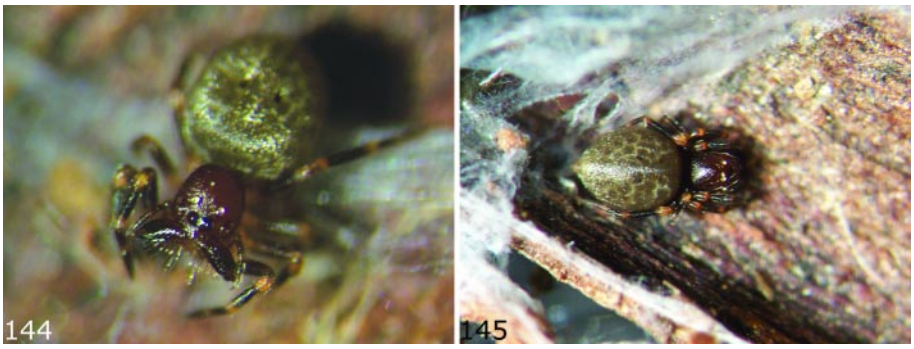


Fig. 144–145. Live female *Anarchaea raveni*, photographed in captivity: *144*, in defensive posture, showing splayed chelicerae and comb of upturned cheliceral hairs; *145*, in resting posture.

In retrolateral view, spine-like outer process of paracymbium directed dorsally (Fig. 138); inner process of paracymbium rectangular (Fig. 138). . . . . *W. spinosa*, sp. nov.

3. Spine-like outer process of paracymbium short (Fig. 132) . . . . . *W. pusilla*, sp. nov.

Spine-like outer process of paracymbium long and sinuous (Fig. 136) . . . . . *W. sinuosa*, sp. nov.

4. Receptacula with 'nose-like' inner lobes almost touching medially (Fig. 34) . . . . . *W. pusilla*, sp. nov.

Receptacula without 'nose-like' inner lobes. 5

5. Receptacula rounded, with smooth margins (Fig. 32) . . . . . *W. spinosa*, sp. nov.

Receptacula with multiple angular lobes (Fig. 33). . . . . *W. sinuosa*, sp. nov.

Westrarchaea pusilla, sp. nov.

(Figs 34, 130–133, 142)

Material examined

Holotype. ♂, Australia, Western Australia, Gura Road, north-west of Narrogin, east site NR 9, wet pitfalls 2, 5, 6, 10, 32°46′09″S, 116°57′08″E, 12.v–16.ix.1998, L. King (WAM T63287).

Paratypes. **Western Australia:** allotype ♀, same data as holotype (WAM T63288); 1♀, 2♂, same data (WAM T46388); 1♀, 10 Mile Hill, wet pitfalls, 31°38′10″S, 116°25′56″E, 15.ix.1998–22.iv./4.xi.1999, L. King (WAM T46381); 1♀, Milyeannup Swamp, east of Augusta, *Agonis* and moss litter, 34°18′S, 115°23′E, 24.vii.1980, S. Peck, J. Peck (WAM 83/592); 1♀, Marangaroo Reserve, Richenda, yellow pan trap, 31°50′S, 115°50′E, 21–27.ix.1997, J. M. Waldock (WAM T46265); 1♂, Wandering Road, wet pitfalls, 32°51′16″S, 116°49′45″E, 2.vi–16.ix.1998, L. King (WAM T46387); 1♂, Dumbleyung Lake, wet pitfalls, 33°22′44″S, 117°38′31″E, 15.x.1999–1.xi.2000, P. Van Heurck *et al*. (WAM T46379); 1♂, north of Ramunen Road, 25 km north-north-east of Nyabing, wet pitfalls, 33°21′27″S, 118°18′51″E, 15.x.1999–1.xi.2000, P. Van Heurck *et al*. (WAM T46380).

Diagnosis

Distinguished from other congeners by the following combination of characters: spine-like outer process of paracymbium short, directed anteroventrally in retrolateral view (Fig. 130); female receptacula distinctive, with prominent 'nose-like' inner lobes (Fig. 34).

Description

Male (*holotype*). Body size: small. Total length 1.22. Carapace 0.54 long, 0.34 wide. Abdomen 0.68 long, 0.42 wide. Colour: carapace mustard-yellow. Abdomen cream. Legs mustard-yellow. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 3, PTB 2, PTC 3 (8). Abdomen: post-epigastric sclerites separate from anterior sclerite; extending to length of VSQ from latter. Dorsal scute absent. Spinnerets encircled by sclerotised cuticle, extending ventrally up to twice length of VSQ from latter. Pedipalp (WAM T46379; Figs 130–133): paracymbium with rounded inner process, bluntly pointed dorsal outer process, rounded, flattened ventral outer process and short, anteroventrally curved spine-like outer process. Distal plate with distal conductor and large prodistal flange. Cuticular sculpture of the distal plate: extensive cluster of spur-like projections extending from near base of embolus to near base of conductor and along prodistal flange. Legs: femur I with dorsally curved row of five retrolateral denticles.

Female (*allotype*). Body size: small. Total length 1.39. Carapace 0.58 long, 0.36 wide. Abdomen 0.81 long, 0.56 wide. Colour: carapace mustard-yellow. Abdomen mustard-yellow. Legs mustard-yellow. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 4, PTB 2, PTC 3 (9). Abdomen: spinnerets encircled by sclerotised cuticle. Epigyne (WAM T46388; Fig. 34): receptacula proximally broad, with rounded outer lobes and nose-like inner lobes just touching medially. Legs: femur I with dorsally curved row of five retrolateral denticles.

Distribution and habitat

Known from south-western Western Australia, from north-east of Perth and east of the Darling Range (to at least the Chinocup Nature Reserve) south to Flinders Bay (Fig. 142).

Etymology

The specific epithet is derived from the Latin adjective 'pusillus', meaning very small, and refers to the body size of this species.

Westrarchaea sinuosa, sp. nov.

(Figs 33, 134–137, 142)

Material examined

Holotype. ♂, Australia, Western Australia, Trigg Dune Bush, Perth, site TD1, wet pitfalls, 31°52′09″S, 115°45′38″E, 13.vii.-25.ix.1995, M. S. Harvey, J. M. Waldock (WAM T46366).

Paratypes. **Western Australia:** allotype ♀, Mount Claremont, Perth, pitfall, 31°57′40″S, 115°46′E, 4.v–6.vii.1995, J. M. Waldock, M. S. Harvey (WAM T46367); 1♀, 1♂, same data except 24.vi–1.ix.1994, J. M. Waldock, A. F. Longbottom (WAM T46273); 1♀, Woodman Point, Perth, pitfall, 32°07′50″S, 115°45′28″E, 28.vi–1.ix.1994, J. M. Waldock, A. F. Longbottom (WAM T46275); 1♂, Bold Park, Perth, pitfall, 31°57′07″S, 115°45′30″E, 20.v–20.vii.1993, M. S. Harvey, J. M. Waldock (WAM T46272).

Diagnosis

Distinguished from other congeners by the following combination of characters: spine-like outer process of paracymbium long, sinuous, directed anteroventrally in retrolateral view (Figs 134, 136); female receptacula distinctive, with multiple angular lobes (Fig. 33).

Description

Male (*holotype*). Body size: small. Total length 1.07. Carapace 0.52 long, 0.34 wide. Abdomen 0.55 long, 0.38 wide. Colour: carapace mustard-yellow. Abdomen cream. Legs mustard-yellow. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges present on outer surface. Dentition: PTA 3, PTB 1, PTC 3 (7). Abdomen: post-epigastric sclerites separate from anterior sclerite; extending to length of VSQ from latter. Dorsal scute absent. Spinnerets encircled by sclerotised cuticle, extending ventrally up to length of VSQ from latter. Pedipalp (Figs 134–137): paracymbium with rounded inner process, bluntly pointed dorsal outer process, rounded, flattened ventral outer process and long, sinuous, anteroventrally curved spine-like outer process. Distal plate with distal conductor and large prodistal flange. Cuticular sculpture of the distal plate: cluster of mound-like lumps and spur-like projections near base of embolus, extending to near base of prodistal flange. Legs: femur I with dorsally curved row of five retrolateral denticles.

Female (*allotype*). In poor condition. Body size: small. Total length 1.22. Carapace 0.49 long, 0.34 wide. Abdomen 0.73 long, 0.50 wide. Colour: body bleached pale yellow. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 4, PTB 1, PTC 3 (8). Abdomen: spinnerets encircled by sclerotised cuticle. Epigyne (Fig. 33): receptacula 'flower-shaped', with multiple angular lobes. Legs: femur I with dorsally curved row of five retrolateral denticles.

Distribution and habitat

Known only from coastal habitats in the Perth region, south-western Australia (Fig. 142).

Etymology

The specific epithet is derived from the Latin adjective 'sinuosus', meaning full of winding, and refers to the distinctive curved shape of the paracymbium of this species.

Westrarchaea spinosa, sp. nov.

(Figs 7, 32, 138–142)

Material examined

Holotype. ♂, Australia, Western Australia, Mount Cooke, 32°25′S, 116°18′E, 16.vi–31.vii.1991, M. S. Harvey, J. M. Waldock (WAM T46266).

Paratypes. **Western Australia:** allotype ♀, same data as holotype except leaf litter, 31.vii.1991 (WAM T46254); 1♀, 2♂, same data except 27.iv.1992 (WAM T46253); 1♂, Stirling Range National Park, Talyuberlup picnic site, wet pitfalls, 34°24′56″S, 117°57′18″E, 25.iv–3.ix.1996, J. M. Waldock, B. Y. Main (WAM T46267); 1♂, Perth Airport, wet pitfalls, 31°58′03″S, 115°58′11″E, 10.v–24.vi.1993, M. S. Harvey, J. M. Waldock (WAM T46274).

Diagnosis

Distinguished from other congeners by the following combination of characters: spine-like outer process of paracymbium long, directed dorsally in retrolateral view (Fig. 138); female receptacula distinctive, rounded with smoothly curved margins (Fig. 34).

Description

Male (*holotype*). Body size: small. Total length 1.14. Carapace 0.51 long, 0.33 wide. Abdomen 0.63 long, 0.42 wide. Colour: carapace mustard-yellow. Abdomen cream, marbled with beige. Legs mustard-yellow. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 3, PTB 2, PTC 3 (8). Abdomen: post-epigastric sclerites separate from anterior sclerite; extending to length of VSQ from latter. Dorsal scute absent. Spinnerets encircled by sclerotised cuticle, extending ventrally up to length of VSQ from latter. Pedipalp (WAM T46274; Figs 138–141): paracymbium with rectangular inner process, bluntly pointed dorsal outer process, rounded, flattened ventral outer process and long, dorsally curved spine-like outer process. Distal plate with distal conductor, large mound-like retromedian apophysis and large prodistal flange. Cuticular sculpture of the distal plate: cluster of less than ten spine-like and spur-like projections along base of prodistal flange. Legs: femur I with dorsally curved row of five retrolateral denticles.

Female (*allotype*). Body size: small. Total length 1.55. Carapace 0.55 long, 0.36 wide. Abdomen 1.00 long, 0.63 wide. Colour: carapace mustard-yellow. Abdomen cream, very lightly marbled mustard-yellow. Legs mustard-yellow. Carapace: dorsal surface of pars cephalica convex, sloping down to AME from posterior margin. Chelicerae: stridulatory ridges absent on outer surface. Dentition: PTA 4, PTB 2, PTC 3 (9). Abdomen: spinnerets encircled by sclerotised cuticle. Epigyne (Fig. 32): receptacula curved, with smoothly rounded, globular distal portions. Legs: femur I with dorsally curved row of five retrolateral denticles.

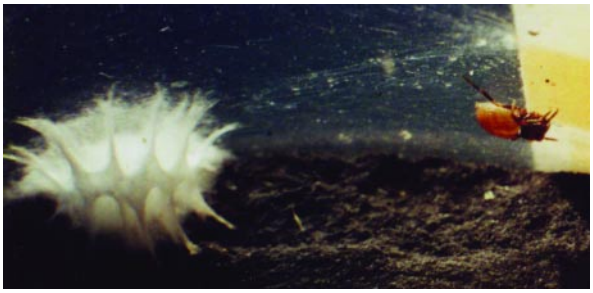


Fig. 146. Egg sac (left) and live female of *Anarchaea raveni*, photographed in captivity. Note the size of the egg sac compared to the female, and the shape of the silken complex.

Distribution and habitat

Known from south-western Western Australia, from Perth south to the Stirling Ranges (Fig. 142).

Etymology

The specific epithet is derived from the Latin adjective 'spinosus' meaning thorny, and refers to the thorn-like shape of the paracymbium of this species.

Phylogeny and biogeography of Pararchaeidae

Cladistic analysis

The phylogeny of the Pararchaeidae was investigated to test the monophyly of genera and to examine the biogeography of the group. A morphological cladistic analysis, incorporating all pararchaeid species represented by males, was performed using NONA Version 2.0 (Goloboff 1998), with the tree search parameters HOLD 1000, HOLD/500, and MULT*200, and parsimony as the optimality criterion. Species known from only single female specimens were not included. *Holarchaea globosa* (Hickman, 1981), was chosen as the outgroup taxon, in accordance with Forster and Platnick (1984). This dataset comprised 28 ingroup pararchaeid taxa and 24 characters (two from general somatic morphology, six from male somatic morphology, 15 from male genitalia, and one from female genitalia) (Tables 1, 2). Multistate characters were treated as unordered, and differential weighting was not applied. Bremer support (or decay) indices (Bremer 1988, 1994) were calculated using NONA, with the search parameters: HOLD 1000; SUB 1; FIND *; HOLD 2000; SUB 3; FIND *; HOLD 4000; SUB 5; FIND *; BSUPPORT.

Phylogeny and biogeography

A single most parsimonious tree was obtained of length 43 steps (consistency index 0.83; retention index 0.93) (Fig. 143). Hypotheses of monophyly of the pararchaeid genera were supported by this analysis, with *Forstrarchaea rubra* found to be the sister species to all other Pararchaeidae. From this hypothesis of pararchaeid phylogeny it is possible to infer the following character transitions: (*1*) proximal denticles on femur I evolved once, and were secondarily lost in *Nanarchaea*; and (*2*) the male dorsal scute evolved once, and was secondarily lost in *Ozarchaea wiangarie*.

Biogeographic patterns have not been previously examined among Pararchaeidae, and this revision provides the first opportunity to study this group in this way. Compared to Australia, the New Zealand pararchaeid fauna is depauperate, with only three species in three genera. Two of these genera, *Forstrarchaea* and *Pararchaea*, are so far known only from New Zealand. The third species in New Zealand, *Ozarchaea forsteri*, is probably the sister species to the Australian taxa *O. ornata*, *O. werrikimbe* and *O. harveyi* in the *Ozarchaea ornata* species-group. *Ozarchaea forsteri* survives in the south-western corner of the North Island of New Zealand (at high altitude on the Pouakai Range south of New Plymouth) and it is the only member of an Australian pararchaeid genus known from outside Australia. That this species is present in New Zealand is further evidence of the relictual nature of this family, and strongly suggests that the Pararchaeidae had diversified before the separation of Australia from Australasian Gondwana during the mid-late Cretaceous (McLoughlin 2001). It is thus somewhat surprising that *O. forsteri* is the *only* known pararchaeid in New Zealand belonging to an otherwise Australian lineage.

Within Australia, several pararchaeid species from south-western Australia have their sister-species or closest relatives in eastern Australia. *Flavarchaea stirlingensis*, from the Stirling Ranges, is the only species of *Flavarchaea* known from Western Australia. Within *Ozarchaea*, all three species-groups are predominantly eastern, each with one species in the south-west (Fig. 143). Widespread aridification of Australia occurred during and after the Miocene, resulting in the fragmentation of populations dependent on forests and refugial habitats (Harvey 2002). This aridification has clearly had a major impact on pararchaeid populations, and the family shares a disjunct eastern (usually on or east of the Great Dividing Range) and south-western distribution typical of Gondwanan relictual arthropods in Australia (e.g. Migidae, Archaeidae). Pararchaeidae, unlike many other araneomorph spiders, have never been observed ballooning and, with a very small number of eggs per egg sac (see Biology of Pararchaeidae, below), it is assumed that dispersal is only *through* appropriate terrestrial microhabitats.

Biology of Pararchaeidae

Food and prey capture

Little is known of the diet of Pararchaeidae, although Forster and Platnick (1984) reported that specimens (presumably of *P. alba* or *F. rubra*) regularly ate Collembola in captivity. The chelicerae of pararchaeids function with a characteristic 'snap-jaw' mechanism, and seem specially adapted for catching fast-moving prey. Upon contacting potential prey or if a spider perceives a threat, the chelicerae are raised and splayed laterally such that each paturon is directed at right-angles to the anterior cephalothorax. This has the result of exposing the peg-teeth, and erecting the ventral cheliceral hairs into an anteriorly directed comb-like formation; each hair is bent and thus upturned in this posture (Fig. 144). When a prey item touches this comb of hairs the chelicerae are quickly snapped together with a forward lunge. Interestingly, a similar system of hair-triggered jaw-release prey capture has also evolved in several genera of ants, including *Anochetus* and *Odontomachus* among Australian Ponerinae, and *Epopostruma*, *Quadristruma* and *Strumigenys* among Australian Myrmicinae (Hölldobler and Wilson 1990; Shattuck 1999).

Table 1. Morphological characters and character states used in the phylogenetic analysis
L = length, *CI* = consistency index, *RI* = retention index

General somatic morphology

(*1*) *Abdomen with brown anterior cardiac stripe and brown posterior chevrons*: (0) absent; (1) present (Figs 9–11). This character is a synapomorphy of the clade (*O. harveyi* + *O. werrikimbe* + *O. ornata*). L = 1, *CI* = 1.0, *RI* = 1.0.

(*2*) *Proximal retrolateral denticles on femur I*: (0) absent; (1) present (see Forster 1955, figs 15, 19). This character is present in all genera except *Forstrarchaea* and *Nanarchaea*. L = 2, *CI* = 0.5, *RI* = 0.66.

Male somatic morphology

(*3*) *Male tarsus I*: (0) not swollen proximally; (1) swollen proximally (see Hickman 1969, fig. 27). This character is a synapomorphy of *Nanarchaea*. L = 1, *CI* = 1.0, *RI* = 1.0.

(*4*) *Medial indentation on male pars cephalica*: (0) absent; (1) present (see Rix 2005, fig. 10). This character is a synapomorphy of *Nanarchaea*. L = 1, *CI* = 1.0, *RI* = 1.0.

(*5*) *Dorsal scute on male abdomen*: (0) absent (Figs 7, 15–16); (1) present (Figs 2–6, 9–12, 14); (2) lost (Fig. 111). This character is absent only in *Forstrarchaea*, *Pararchaea* and *Westrarchaea*, where the condition is probably plesiomorphic, and in *Ozarchaea wiangarie*, where it has been secondarily lost (evidenced by the concomitant loss of hairs between DSP1). L = 2, *CI* = 1.0, *RI* = 1.0.

(*6*) *Colour of male dorsal scute*: (0) pale or very light brown (Figs 4–6, 9–11, 14); (1) dark brown (Figs 2–3, 12). Character state (1) is a synapomorphy of *Anarchaea*, with a homoplasious occurrence in *Ozarchaea valida*. L = 2, *CI* = 0.5, *RI* = 0.75.

(*7*) *Size and shape of male dorsal scute*: (0) very small and transversely elongate; (1) small and circular, oval or rectangular; (2) large; (3) very large. Male scute morphology varies widely among Pararchaeidae, although states (0) and (3) are synapomorphic for the *Ozarchaea daviesae* species-group and the genus *Nanarchaea* respectively. Large scutes are those that extend posterior to the level of DSP2. L = 4, *CI* = 0.75, *RI* = 0.88.

(*8*) *Male spinneret sclerite/s*: (0) absent; (1) sclerite encircling spinnerets (see Rix 2005, fig. 17); (2) with separate dorsal and ventral sclerites (see Rix 2005, fig. 28). The absence of a complete ring of sclerotised cuticle around the male anal tubercle and spinnerets is a synapomorphy of *Anarchaea*. L = 2, *CI* = 1.0, *RI* = 1.0.

Male genitalia

(*9*) *Inner process of paracymbium*: (0) absent (see Rix 2005, fig. 26); (1) large, diverging near base of paracymbium (Figs 20, 22, 128–129); (2) small, diverging distally (Figs 46, 70, 79, 136). L = 3, *CI* = 0.66, *RI* = 0.66.

(*10*) *Size of inner process of paracymbium when small*: (0) short, not extending distally beyond distal tip/s of outer process/es (Figs 46, 136); (1) long, extending distally well past distal tip/s of outer process/es (Figs 70, 79). L = 1, *CI* = 1.0, *RI* = 1.0.

(*11*) *Distal tip of inner process of paracymbium*: (0) broadly rounded or square (Figs 46, 68, 130, 138); (1) pointed (83, 101). A pointed distal tip to the inner process of the paracymbium is a synapomorphy of *Ozarchaea*. L = 1, *CI* = 1.0, *RI* = 1.0.

(*12*) *Ventral outer process on paracymbium*: (0) absent (Figs 24, 70, 129); (1) present (Figs 20, 54, 79, 132). L = 3, *CI* = 0.33, *RI* = 0.5.

(*13*) *Upper surface of ventral outer process of paracymbium*: (0) without cuticular ridges; (1) with parallel rows of cuticular ridges (Fig. 79). This character is a synapomorphy of *Ozarchaea*. L = 1, *CI* = 1.0, *RI* = 1.0.

(*14*) *Ventral outer process of paracymbium with 'wing-like' extension*: (0) absent; (1) present (Figs 75, 79, 83, 87, 90). This character is a synapomorphy of the *Ozarchaea ornata* species-group. L = 1, *CI* = 1.0, *RI* = 1.0.

(*15*) *Ventral outer process of paracymbium with anterior spine-like process*: (0) absent; (1) present (Figs 132, 136, 140). This character is a synapomorphy of *Westrarchaea*. L = 1, *CI* = 1.0, *RI* = 1.0.

(*16*) *Symmetry of dorsal and ventral outer processes of paracymbium*: (0) asymmetrical (Figs 20, 46, 79, 132); (1) symmetrical (Figs 93, 97, 101, 109). Symmetrical outer processes are characteristic of the *Ozarchaea daviesae* and *Ozarchaea westraliensis* species-groups. L = 1, *CI* = 1.0, *RI* = 1.0.

(*17*) *Lower flange on paracymbium*: (0) absent; (1) present (Figs 42, 46). This character is a synapomorphy of the clade (*Flavarchaea anzac* + *F. badja*). L = 1, *CI* = 1.0, *RI* = 1.0.

(*18*) *Pointed ventral process on paracymbium*: (0) absent; (1) present (Figs 50, 54). This character is a synapomorphy of the clade (*Flavarchaea hickmani* + *F. lulu* + *F. barmah* + *F. lofty*). L = 1, *CI* = 1.0, *RI* = 1.0.

(*19*) *Pointed retrodistal apophysis on distal plate*: (0) absent; (1) present (Figs 19, 23, 129). This character is present in several genera, where it is probably homoplasious. L = 2, *CI* = 0.5, *RI* = 0.75.

(*20*) *Cuticular sculpture of distal plate*: (0) absent (Figs 41, 45, 53); (1) present (Figs 21, 71, 84, 98, 102, 129, 133). This character is present in all pararchaeid genera except *Flavarchaea*, where its absence is probably apomorphic. L = 1, *CI* = 1.0, *RI* = 1.0.

(*21*) *Spur-like and spine-like cuticular projections on distal plate*: (0) absent (see Forster and Platnick 1984, fig. 237); (1) in band across base of distal plate (see Rix 2005, fig. 24); (2) in dense, small cluster at base of embolus (Figs 21, 25); (3) in very small cluster (<3 projections) near base of embolus (Figs 94, 98); (4) in very small cluster at base of prodistal flange (Fig. 141); (5) extending sparsely from centre of distal plate along prodistal flange (Figs 71, 129, 137); (6) in dense cluster on or extending along prodistal flange (Figs 84, 89); (7) in dense, curved cluster extending from near base of embolus (Figs 102, 106, 110); (8) extensively distributed over most of distal plate (Fig. 133). The distribution of spur-like *plus* spine-like cuticular projections on the distal plate is highly variable but usually synapomorphic for clades. L = 8, *CI* = 1.0, *RI* = 1.0.

(*22*) *Whorl of spine-like cuticular projections on distal plate*: (0) absent; (1) present (Figs 102, 110). This character is a synapomorphy of the clade (*Ozarchaea westraliensis* + *O. janineae*). L = 1, *CI* = 1.0, *RI* = 1.0.

(*23*) *Embolus*: (0) unmodified; (1) with remarkable leaf-like process distally (Fig. 39). This character is a synapomorphy of the genus *Flavarchaea*. L = 1, *CI* = 1.0, *RI* = 1.0.

Female genitalia

(*24*) *Separation of inner margins of female receptacula*: (0) receptacula separate or only just touching; (1) broadly touching. State (1) is a synapomorphy of the *Ozarchaea daviesae* species-group. L = 1, *CI* = 1.0, *RI* = 1.0.

Moulting

A female *Anarchaea raveni* was observed moulting in captivity on 7 April 2001. The spider clung upside-down to the glass vial in which it was housed, and was initially observed pulsating as haemolymph was pumped under pressure into its cephalothorax. The observed moulting process was similar to that of many other araneomorph spiders, whereby the carapace and abdominal cuticle were shed first (with the spider still clinging upside-down to the glass vial, rather than hanging on a line of silk), followed by the gravity-aided liberation and stretching of the legs.

Courtship and mating

Courtship and mating were observed between a male and female *Anarchaea raveni* on 15 May 2003 after the spiders were placed together in a glass vial. The male, upon contacting drag-line silk produced by the female, began moving around the base of the vial with fast flickering movements of the anterior legs. After contact was made between the two spiders the male tapped the female with leg I (both legs), and mating followed. The mating position was of the 'head-to-head' type, similar to that illustrated for the mecysmaucheniid *Aotearoa magna* (Forster, 1949) in Forster and Forster (1999: 43) and Forster and Platnick (1984: 27). The left pedipalp was inserted first, and then 'twisted' owing to swelling of the haematodocha, pedipalpal flexion and a shifting of the male's body. This pedipalpal twisting and flexion resulted in the tip of the cymbium being directed anteriorly with respect to the female (flexed posteriorly with respect to the male) and the prolateral side of the cymbium being positioned outwards (retrolaterally) with respect to the male; it also had the effect of shifting the male's body from directly under the sternum of the female, to off to the left side of her body. Swelling of the haematodochae was rhythmic, and mating lasted at least one hour. It could not be determined if the pedipalps were inserted more than once.

Egg sac

Eggs sacs of Pararchaeidae were undescribed (Forster and Platnick 1984; Forster and Forster 1999), and thus the laying of an egg sac in captivity by a female *Anarchaea raveni* was a highlight of this study.

A gravid female *A. raveni* was collected from the field and housed in captivity in a small plastic container. The spider did not eat while in captivity, but laid an egg sac two weeks after collection, on 14 October 2001. The egg sac was a relatively small discoid structure attached to the base/side junction of the container, but was surrounded by an extensive and remarkable silken complex, several times larger than the female that built it (Fig. 146). This silken complex was composed of two layers: a thin, smooth internal layer, surrounding the egg sac, and a complex external layer, with multiple lateral ridges. The female did not stay with the egg sac after its completion, and demonstrated no (apparent) maternal attachment to it. Five juvenile spiders hatched out of the egg sac.

Subsequent field work in south-eastern Queensland and Tasmania revealed two more egg sacs suspected to be made by pararchaeids, of similar shape, attached to the underside of a rock and a log respectively. That in Tasmania probably belonged to *Nanarchaea bryophila*, as specimens were located in the immediate vicinity.

Conservation of Pararchaeidae

This revision of the Pararchaeidae raises several issues of conservation importance. The first is that a large minority of pararchaeid species may be short-range endemic taxa (SREs), with ranges limited to less than 10000 km^2 (see Harvey 2002). Given that pararchaeid spiders are usually rare, and good collections of specimens from throughout a particular region are even rarer, it can be hard to determine whether a species really is restricted in distribution, or merely uncollected in surrounding areas. Nonetheless, in south-eastern and north-eastern Queensland, south-western

Table 2. Character matrix for all pararchaeid species represented by males
Type species are highlighted (*)

Taxa	Characters		
	0000000001	1111111112	2222
	1234567890	1234567890	1234
Holarchaea globosa	00000--0--	----------	--00
*Anarchaea corticola**	010011221-	00----001?	??0?
Anarchaea falcata	010011221-	0100000011	2000
Anarchaea raveni	010011221-	00----0011	2000
Anarchaea robusta	010011220-	------0001	1000
Flavarchaea anzac	0100102120	0100001000	--10
Flavarchaea badja	0100102120	0100001000	--10
Flavarchaea barmah	0100101120	0100000100	--10
Flavarchaea hickmani	0100101120	0100000100	--10
Flavarchaea lofty	0100101120	0100000100	--10
*Flavarchaea lulu**	0100102120	0100000100	--10
*Forstrarchaea rubra**	00000--120	0100000011	0000
*Nanarchaea binnaburra**	0011103121	00----0001	5000
Nanarchaea bryophila	0011103121	00----0001	5000
Ozarchaea daviesae	0100100121	1110010001	3001
Ozarchaea harveyi	1100101121	1111000001	2000
Ozarchaea janineae	0100101121	1110010001	7100
*Ozarchaea ornata**	1100101121	1111000001	2000
Ozarchaea saxicola	0100100121	11?001000?	??01
Ozarchaea spurgeon	0100101121	1110010001	7000
Ozarchaea valida	0100101121	1111000001	600?
Ozarchaea waldockae	0100100121	1110010001	300?
Ozarchaea werrikimbe	1100101121	1111000001	200?
Ozarchaea westraliensis	0100101121	1110010001	7100
Ozarchaea wiangarie	01002--121	1111000001	600?
*Pararchaea alba**	01000--11-	00----0011	5000
Westrarchaea pusilla	01000--120	0100100001	8000
*Westrarchaea sinuosa**	01000--120	0100100001	5000
Westrarchaea spinosa	01000--120	0100100001	4000

Western Australia and Tasmania, good sampling over many years has revealed several species that are likely to be SREs, and one lineage characterised solely by rare and restricted species. The presence of two species of *Ozarchaea* (*O. spurgeon* and *O. platnicki*) on mountain tops in north-eastern Queensland is consistent with distribution patterns found for other arthropod groups in the Wet Tropics (see Yeates *et al*. 2002). The closely related species in the *Ozarchaea daviesae* species-group (*O. saxicola*, *O. waldockae* and *O. daviesae*) from Tasmania, south-western Australia and south-eastern Queensland respectively, are all known from single localities and less than four specimens each. *Flavarchaea stirlingensis*, the only species of *Flavarchaea* in Western Australia, is known from the Stirling Ranges, a well known montane region with many endemic taxa.

With the issue of conservation comes the question of extinction, and there is cause for concern for at least two species of Pararchaeidae in Tasmania. *Anarchaea corticola* and *O. saxicola* were both described by Hickman (1969) from specimens collected at the Queen's Domain in Hobart. Extensive sampling in Tasmania over several decades has not, to my knowledge, revealed any new specimens or populations of these species, and neither species appears to have been collected since 1955. Indeed, I conducted field work at the Queen's Domain in early 2002 and late 2003, but found no evidence of any Pararchaeidae, despite targeted hand collecting. The bushland at this locality is now seriously degraded, and fires are a regular occurrence owing to arson.

As a direction for future land management in Australia, this study has revealed an important characteristic of the distribution of several pararchaeid species. For a family long regarded as being restricted to wet forests (Forster and Platnick 1984), several of the species described in this paper were collected from semi-arid and even arid environments. Davies (1988: 162) was the first to describe this phenomenon in a pararchaeid species (*O. daviesae*) from the semi-arid 'Brigalow Belt' of south-eastern Queensland, stating that: 'until now [the Pararchaeidae] had been collected from moss and litter of rainforests; thus it is exciting to find a species at Lake Broadwater'. Indeed, several species of *Ozarchaea* and *Westrarchaea* are known from transitional, semi-arid or arid habitats, with *O. westraliensis* widely distributed in the Western Australian 'Wheatbelt' and 'Goldfields'; a specimen was even collected at Lorna Glen Station, near Lake Carnegie in central Western Australia. Many other pararchaeid species are also known from dry sclerophyll forests and coastal heathland habitats on the eastern seaboard of Australia. Although the Pararchaeidae are clearly a relictual family, this study reveals the importance of protecting drier forests, semi-arid scrubs and coastal heaths *as well as* rainforests and wet sclerophyll forests for the conservation of species.

Acknowledgments

This paper would not have been possible without the support and assistance of many people. To Norman Platnick (AMNH), Graham Milledge (AMS), Charles Griswold and Darrell Ubick (CAS), Grace Hall (LRA), Phil Sirvid (MNZ), Abigail Blair and Brian Patrick (OMD), Robert Raven and Owen Seeman (QMB), Lisa Boutin (QVM), David Hirst (SAM), Mark Harvey and Julianne Waldock (WAM), I am particularly grateful for loans of material and for sending so promptly such rare and valuable specimens. Thanks to Robert Raven, Barbara Baehr and Owen Seeman for assistance and great encouragement during my time at the Queensland Museum in 2005, and to Robert Raven for use of the scanning electron microscopy facilities. I received invaluable support and hospitality from Lisa Boutin during two field trips to Tasmania in 2002 and 2003, and from Mark Harvey and Mara Blosfelds during two visits to Perth in 2002 and 2005. I am very grateful to my father, Alan Rix, for years of assistance and patience in collecting pararchaeids and other spiders in the field. Thanks are also due to Robert Raven for his helpful comments on an earlier draft of the manuscript.

References

Bremer, K. (1988). The limits of amino acid sequence data in angiosperm phylogenetic reconstruction. *Evolution* **42**, 795–803.

Bremer, K. (1994). Branch support and tree stability. *Cladistics* **10**, 295–304. doi:10.1111/j.1096-0031.1994.tb00179.x

Davies, V. T. (1988). Spiders. In 'Lake Broadwater, The Natural History of an Inland Lake and its Environs'. (Ed. G. Scott.) pp. 162–169. (Lake Broadwater Natural History Association: Toowoomba, Australia.)

Forster, R. R. (1949). New Zealand spiders of the family Archaeidae. *Records of the Canterbury Museum* **5**, 193–203.

Forster, R. R. (1955). Spiders of the family Archaeidae from Australia and New Zealand. *Transactions of the Royal Society of New Zealand* **83**, 391–403.

Forster, R. and Forster, L. (1999). 'Spiders of New Zealand and Their Worldwide Kin.' (University of Otago Press: Dunedin, New Zealand.)

Forster, R. R., and Platnick, N. I. (1984). A review of the archaeid spiders and their relatives, with notes on the limits of the superfamily Palpimanoidea. *Bulletin of the American Museum of Natural History* **178**, 1–106.

Goloboff, P. A. (1998). 'Nona. Version 2.0.' (Program and documentation available at www.cladistics.com/, verified March 2006.)

Harvey, M. S. (2002). Short-range endemism among the Australian fauna: some examples from non-marine environments. *Invertebrate Systematics* **16**, 555–570. doi:10.1071/IS02009

Hickman, V. V. (1969). New species of Toxopidae and Archaeidae (Araneidae). *Papers and Proceedings of the Royal Society of Tasmania* **103**, 1–11.

Hickman, V. V. (1981). New Tasmanian spiders of the families Archaeidae, Cycloctenidae, Amaurobiidae and Micropholcommatidae. *Papers and Proceedings of the Royal Society of Tasmania* **115**, 47–68.

Hölldobler, B., and Wilson, E. O. (1990). 'The Ants.' (Harvard University Press: Cambridge, MA, USA.)

McLoughlin, S. (2001). The breakup history of Gondwana and its impact on pre- Cenozoic floristic provincialism. *Australian Journal of Botany* **49**, 271–300. doi:10.1071/BT00023

Penney, D. (2003). *Afrarchaea grimaldii*, a new species of Archaeidae (Araneae) in Cretaceous Burmese amber. *The Journal of Arachnology* **31**, 122–130.

Rix, M. G. (2005). A review of the Tasmanian species of Pararchaeidae and Holarchaeidae (Arachnida, Araneae). *The Journal of Arachnology* **33**, 135–152.

Schütt, K. (2000). The limits of the Araneoidea (Arachnida: Araneae). *Australian Journal of Zoology* **48**, 135–153. doi:10.1071/ZO99050

Shattuck, S. O. (1999). 'Australian Ants, Their Biology and Identification.' (CSIRO Publishing: Melbourne, Australia.)

Yeates, D. K., Bouchard, P., and Monteith, G. B. (2002). Patterns and levels of endemism in the Australian Wet Tropics rainforest: evidence from flightless insects. *Invertebrate Systematics* **16**, 605–619. doi:10.1071/IT01032

Manuscript received 25 July 2005, revised and accepted 15 February 2006.

Appendix 1. List of pararchaeid species
(Type species are indicated by an asterisk.)

**alba*, *Pararchaea*	NZ
anzac, *Flavarchaea*	QLD
badja, *Flavarchaea*	NSW
barmah, *Flavarchaea*	NSW, VIC
**binnaburra*, *Nanarchaea*	QLD
bodalla, *Ozarchaea*	NSW
bondi, *Ozarchaea*	NSW
bryophila, *Nanarchaea*	NSW, VIC, TAS
**corticola*, *Anarchaea*	TAS
daviesae, *Ozarchaea*	QLD
falcata, *Anarchaea*	NSW
forsteri, *Ozarchaea*	NZ
harveyi, *Ozarchaea*	WA
hickmani, *Flavarchaea*	TAS
janineae, *Ozarchaea*	NSW
lofty, *Flavarchaea*	SA
**lulu*, *Flavarchaea*	TAS
**ornata*, *Ozarchaea*	TAS
platnicki, *Ozarchaea*	QLD
pusilla, *Westrarchaea*	WA
raveni, *Anarchaea*	QLD
robusta, *Anarchaea*	TAS
**rubra*, *Forstrarchaea*	NZ
saxicola, *Ozarchaea*	TAS
**sinuosa*, *Westrarchaea*	WA
spinosa, *Westrarchaea*	WA
spurgeon, *Ozarchaea*	QLD
stirlingensis, *Flavarchaea*	WA
stradbroke, *Ozarchaea*	QLD
valida, *Ozarchaea*	NSW
waldockae, *Ozarchaea*	WA
werrikimbe, *Ozarchaea*	NSW
westraliensis, *Ozarchaea*	WA
wiangarie, *Ozarchaea*	NSW